51336

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:		:	PATENT
	Bernd HANSEN	:	
		:	Art Unit: 3721
Serial No.:	10/582,869	:	
		:	Examiner: T. K. Truong
Filed:	June 14, 2006	:	
For:	METHOD AND DEVICE FOR PRODUCING AND FILLING CONTAINERS	:	Appeal No. _____

APPELLANT'S REVISED BRIEF
ON APPEAL UNDER 37 C.F.R. § 41.37

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

For the appeal to the Board of Patent Appeals and Interferences from the decision dated August 13, 2008 of the Primary Examiner twice and finally rejecting claims 12-26 in connection with the above-identified application, Applicant-Appellant submits the following brief in accordance with 37 C.F.R. §41.37.

1. Real Party in Interest

The inventor, Bernd Hansen, has not assigned his rights, titles and interests in the patent application.

2. Related Appeals and Interferences

There are no other related appeals or interferences known to Appellants, Appellants' legal representative, or assignee, which may directly affect or be directly affected by or have a bearing on the Board's decision in the pending Appeal.

3. Status of Claims

Claims 1-11 are cancelled. Claims 12-26 are pending, are rejected, and are on appeal.

4. Status of Amendments

Subsequent to the August 13, 2008 final Office Action containing the final rejection, an Amendment was filed on November 13, 2008 and is to be entered, as indicated in the December 9, 2008 Advisory Action.

5. Summary of the Invention

Claim 12 covers a method of producing and filling containers (p. 4, lines 10-11; Figs. 1a-c, 2a-c). The method comprises the steps of extruding a tube 12 of softened plastic material into an open mold 16 (p. 4, lines 11-12; Figs. 1a, 2a), closing the tube 12 at its projecting end by closing the mold 16 to form a container bottom (p. 4, lines 17-19), separating the tube above the mold by a separating element 28 to form a filler opening 18 (p. 4, lines 13-15 and 23; Figs. 1a-b, 2a-b), moving the mold 16 with the tube 12 having the filler opening 18 in the mold 16 into a filling position (p. 4, lines 20-21; Fig. 1c, 2c), after the tube 12 is formed into the container by generating a pressure gradient acting on the tube 12 in the mold 16 to expand the tube 12 (p. 4, lines 21-24; Figs. 1a-c, 2a-c), filling the container through the filler opening 18 (p. 4, lines 24-25; Figs. 1c, 2c), sealing the filler opening 18 (p. 5, lines 10-13), covering the filler opening 18 by a

sterile barrier 30 at least from the formation time for the filler opening 18 to filling of the tube, and conveying at least one sterile medium in a direction of the filler opening 18 from the sterile barrier 30 by a media delivery device (p. 5, line 16, to p. 7, line 25; Figs. 1a-b, 2a-b).

Claim 24 covers a device for producing and filling containers (p. 4, lines 10-11; Figs. 1a-c, 2a-c). The device comprises at least one mold 16 having mold parts 14 movable between open and closed positions (p. 4, lines 12-14; Figs. 1a-b, 2a-b). An extruder 10 extrudes at least one tube 12 of softened plastic material into the mold 16 with the mold parts 14 in their open positions (p. 4, lines 11-12; Figs. 1a, 2a). Welding edges on the mold weld a projecting end of the tube to form a container bottom (p. 4, lines 17-19; Figs. 1a-b, 2a-b). A pressure gradient generator acts on and expands the tube 12 in the mold 16 (p. 4, lines 21-24; Figs. 1a-c, 2a-c). A separating element 28 forms a filler opening 18 by separating the tube 12, and is movable above the mold 16 between a retracted position and an operating position (p. 4, lines 13-15 and 23; Figs. 1a-b, 2a-b). A filling device 20 is located in a sterile filling space (p. 4, lines 21-25; Figs. 1a, 2c). A displacement device 24 moves the mold 16 between an extrusion position below the extruder 10 (Fig. la) and a filling position (Fig. 1c) below the filling device 20 in the sterile filling space (p. 4, line 10, to p. 5, line 1). A sterile barrier 30 covers the filler opening 18 of the tube 12 in the mold 16 from formation thereof to filling of the tube 12 in the sterile filling space (p. 5, lines 8-21; Figs. 1a-c, 2a-c). A media deliverer 36 is coupled to the sterile barrier 30, and conveys sterile medium in a direction of the filler opening 18 (p. 5, lines 22-27; Figs. 1a-b, 2a-b).

By performing the method and forming the device in this manner, sterile media flows from the sterile barrier in the direction of the filler opening to avoid contamination of the formed container. This method step and structure proactively deals with the problem of contamination, and involves significantly more than merely use of a healed sterile barrier.

6. Grounds for Rejection to be Reviewed on Appeal

Claim 14 stands rejected under 35 U.S.C. § 112, second paragraph, on the ground that "a specified over-pressure" is vague and indefinite.

Claims 12-14 and 17-25 stand rejected under 35 U.S.C. § 102(b) as being anticipated by DE 10 063 282 C2 to Hansen.

Claims 15, 16 and 26 stand rejected under 35 U.S.C. §103 as being unpatentable over the Hansen German patent in view of U.S. Patent Publication No. US2002/0159915 A1 to Zelina.

Claims 12-14, 17, 20 and 22-25 stand rejected under 35 U.S.C. §102 as being anticipated by Japanese Patent Publication No. 60049919 A to Furui Koichi.

7. Argument

A. Rejection under 35 U.S.C. § 112, Second Paragraph

Claim 14 stands rejected under 35 U.S.C. § 112, second paragraph, on the ground that "a specified over-pressure" is vague and indefinite.

As clearly indicated in the April 24, 2008 Amendment (p. 10, last two lines), as well as the application specification, this phrase means a pressure over ambient pressure as would be readily recognized by a person skilled in this art. As disclosed in the substitute specification on page 6, lines 6-8:

> "Conveyance of the sterile medium 34, especially in the form of sterile air, to the cover plate 30 and through the media exit points 38 in the direction of the filler opening 18 is effected by excess or overpressure, i.e., a pressure greater than ambient air pressure."

Additionally, such terminology ("over pressure") is used in U.S. Patent Nos. 7,200,975 (column 8, line 3) and 7,401,417 (column 3, line 4), as well as other patents, demonstrating that such terminology is acceptable. Copies of these two patents are included in Appendix B.

In view of the specified and recognized definition, the term "over-pressure" is not vague or indefinite. Accordingly, reconsideration and reversal of the rejection of claim 14 as being indefinite is requested.

B. Rejection under 35 U.S.C. § 102 over Hansen German Patent

(1) Claim 12

Claim 12 is novel and nonobvious over the cited Hansen German patent by reciting a method for producing and filling containers wherein a sterile barrier covers the filler opening at least from the formation time of the filler opening to the filling of the tube, and wherein a sterile medium is conveyed at least in the direction of the filler opening from the sterile barrier by a media delivery device. Such covering of the filler opening in combination with the conveying of the sterile medium in the direction of the filler opening is not disclosed or rendered obvious by any of the cited patents.

Claim 12 stands rejected under 35 U.S.C. §102 as being anticipated by DE 10 063 282 C2 to Hansen, with Pub. No. US 2004/0065983 A1 used as a translation thereof. The Hansen German patent is cited for disclosing the basic blow-filling-sealing method. The sterile barrier 23 is interpreted as covering the opening of the tube from the time of its formation to its filling, with its heating of the surrounding air creating a sterile medium that is moved in the direction of the filler opening.

For this rejection, the cited Hansen German patent is interpreted as having a sterile barrier 23 in the form of a heated plate that heats the surrounding air so as to produce allegedly hot air as a sterile medium moved in a direction of a filler opening by a media delivery device also allegedly provided by the heated plate 23. However, as clearly illustrated in the Hansen German patent, heated plate 23 is located above mold halves 5 of mold 6 and is spaced above the mold 6 by the height of sterile filling space 31. The filler opening 15 formed in the tube by heated cutting edge 21 is positioned below the sterile filling space, as illustrated in Fig. 4 and described in paragraph [0020], lines 16-19 of the corresponding U.S. patent publication (US 2004/0065983 A1). To the extent that heated air may be generated by the heated plate 23, such heated air, being of lighter weight than the surrounding ambient air, will move upwardly in a direction away from the filler opening in a manner similar to hot air in a balloon. Any heated air surrounding the Hansen German patent plate 23 will not move downwardly in the direction of the filler opening 15 in the tubes to provide a sterilization effect on the openings of the tubes or containers. In contrast, the method of claim 12 requires conveying a sterile medium in a direction of the filler opening from the sterile barrier by the media delivery device or the media deliverer. Such method step is not disclosed or rendered obvious by the Hansen German patent, when considered alone or in combination with any of the other cited patent documents.

The Applicant's description of the Hansen German patent air flow as being away from the container opening is allegedly not supported by the disclosure of that patent. However, the fact that hot air rises, due to its lower density or weight relative to the surrounding colder air, provides clear and adequate support according to the basic laws of physics. No response or any comments in support of the rejection adequately refute this analysis or satisfy the Office's burden of showing inherency. The alleged expansion of the heat in all directions is not supported by any

analysis or evidence, or any specific disclosure in the Hansen German patent. The covering by the heated plate 23 of the cited Hansen German patent does not involve the delivery of a sterile medium, as claimed. The fact that the Hansen German patent plate 23 is heated to a germ-killing temperature, only makes that plate sterile but does not deliver a sterile medium in the direction of the filler opening to meet the claimed method step.

Since the Hansen German patent fails to disclose or render obvious the method step of conveying a sterile medium in the direction of the filler opening from a sterile barrier by a media delivery device, claim 12 is not anticipated by or rendered obvious in view of this Hansen German patent, considered alone or in any obvious combination with the other cited patents.

(2) Claim 24

Claim 24 is novel and nonobvious over the Hansen German patent by reciting a device for producing and filling containers wherein a sterile barrier covers the filler opening at least from the formation time of the filler opening to the filling of the tube, and wherein a sterile medium is conveyed at least in the direction of the filler opening from the sterile barrier by a media delivery device. Such covering of the filler opening in combination with the conveying of the sterile medium in the direction of the filler opening is not disclosed or rendered obvious by any of the cited patents.

Claim 24 stands rejected under 35 U.S.C. §102 as being anticipated by DE 10 063 282 C2 to Hansen, with Pub. No. US 2004/0065983 A1 used as a translation thereof. The Hansen German patent is cited for disclosing the basic blow-filling-sealing apparatus. The sterile barrier 23 is interpreted as covering the opening of the tube from the time of its formation to its filling,

with its heating of the surrounding air creating a sterile medium that is moved in the direction of the filler opening.

For this rejection, the cited Hansen German patent is interpreted as having a sterile barrier 23 in the form of a heated plate that heats the surrounding air so as to produce allegedly hot air as a sterile medium moved in a direction of a filler opening by a media delivery device also allegedly provided by the heated plate 23. However, as clearly illustrated in the Hansen German patent, heated plate 23 is located above mold halves 5 of mold 6 and is spaced above the mold 6 by the height of sterile filling space 31. The filler opening 15 formed in the tube by heated cutting edge 21 is positioned below the sterile filling space, as illustrated in Fig. 4 and described in paragraph [0020], lines 16-19 of the corresponding U.S. patent publication (US 2004/0065983 A1). To the extent that heated air may be generated by the heated plate 23, such heated air, being of lighter weight than the surrounding ambient air, will move upwardly in a direction away from the filler opening in a manner similar to hot air in a balloon. Any heated air surrounding the Hansen German patent plate 23 will not move downwardly in the direction of the filler opening 15 in the tubes to provide a sterilization effect on the openings of the tubes or containers. In contrast, the device of claim 24 requires conveying a sterile medium in a direction of the filler opening from the sterile barrier by the media delivery device or the media deliverer. Such structure are not disclosed or rendered obvious by the Hansen German patent, when considered alone or in combination with any of the other cited patent documents.

Applicant's description of the Hansen German patent air flow as being away from the container opening is allegedly not supported by the disclosure of that patent. However, the fact that hot air rises, due to its lower density or weight relative to the surrounding colder air, provides clear and adequate support according to the basic laws of physics. No response or any

comments adequately refute this analysis or satisfy the Office's burden of showing inherency. The alleged expansion of the heat in all directions is not supported by any analysis or evidence or any specific disclosure in the Hansen German patent. The covering by the heated plate 23 of the cited Hansen German patent does not involve the media deliver of a sterile medium, as claimed. The fact that the Hansen German patent plate is heated to a germ-killing temperature, only makes that plate sterile but does not make that plate a media deliverer of a sterile medium in the direction of the filler opening, as claimed.

Since the Hansen German patent fails to disclose or render obvious a media deliverer coupled to the sterile barrier for conveying sterile medium in a direction of the filler opening, claim 24 is not anticipated by or rendered obvious in view of this Hansen German patent, considered alone or in any obvious combination with the other cited patents.

To support an anticipation rejection, all elements of the claim must be found in a single reference. In re Royka et al., 490 F.2d 981, 984, 180 USPQ 580, 582 (CCPA 1974). Rejections under 35 U.S.C. § 102 are proper only when the claimed subject matter is identically disclosed or described in the prior art. In re Marshall, 578 F.2d 301, 304, 198 USPQ 344, 346 (CCPA 1978). Since all elements of claims 12 and 24 are not identically disclosed or described in the Hansen German patent or the Japanese patent, the rejection under 35 U.S.C. § 102 is untenable.

Accordingly, claims 12 and 24 are patentably distinguishable over the cited patents.

(3) Rejections of Dependent Claims Based on Hansen German Patent

Claims 13-14 and 17-23 and claim 25, being dependent upon claims 12 and 24, respectively, are also allowable for the above reasons. Moreover, these dependent claims recite additional features further distinguishing them over the cited patent document.

(a) Claim 13

Claim 13 is further distinguished by the sterile medium being sterile air, inert gas and/or hydrogen peroxide. Since the Hansen German patent barrier merely heats surrounding air, such air is not sterile air, an inert gas or hydrogen peroxide.

(b) Claim 14

Claim 14 is further distinguished by the sterile medium being conveyed at a specified over-pressure (i.e., above ambient air pressure). The air heated by barrier 23 of the Hansen German patent is at ambient pressure, not an over-pressure, as claimed.

(c) Claim 17

Claim 17 is further distinguished by the sterile barrier being a plate-shaped cover element that provides the filler opening with sterile media until the container is filled below a sterile filling space. As noted above, the plate 23 of the Hansen German patent does not provide the tube filler opening with a sterile medium, as claimed, since the hot air generated thereby will rise in a direction away from the filler opening and is not sterile.

(d) Claim 18

Claim 18 is further distinguished by the concurrent movement of the cover element and the separating element and the covering of the filler element until the filling of the container. Such movement is not disclosed in combination with the other recited limitations.

(e) Claim 19

Claim 19 is further distinguished by the synchronous movement of the parts of the mold with the cover element, as described in connection with the embodiment of Fig. 2a-c. Such embodiment is not disclosed or rendered obvious by the Hansen German patent.

(f) Claim 20

Claim 20 is further distinguished by the container being flushed across the filler opening by the sterile media. No such flushing or sterile media is provided by the alleged air heated by the barrier 23 of the Hansen German patent.

(g) Claim 21

Claim 21 is further distinguished by the container being partially filled with the sterile media. Due to the rising of the air heated by the barrier 23 in the Hansen German patent, no such filling will occur.

(h) Claims 22 and 23

Claims 22 and 23 are further distinguished by the specific temperature ranges recited therein. Such ranges are not shown to be anticipated in the claimed combination.

(i) Claim 25

Claim 25 is further distinguished by the media deliverer comprising outlet ports and at least one inlet port in a plate shaped cover element. No such outlet ports and inlet port are disclosed in the Hansen German patent.

C. Rejection Under 35 U.S.C. §103 over the

Hansen German Patent in View of Zelina Publication

(1) Claims 15 and 16

Claims 15 and 16 are further distinguished by non-viable particles being exhausted by a suction device, or particularly a vacuum device (claim 16). Relative to this feature, the Zelina vacuum pump 112 is cited. However, such vacuum pump does not operate in conjunction with the dispensing of sterile media from a movable sterile barrier.

(2) Claim 26

Claim 26 is further distinguished by a suction frame that can enclose the cover element in one position. No such combination is disclosed or rendered by the Hansen German patent and/or the Zelina publication, for the reasons discussed above relative to claims 15-16.

D. Rejection under 35 U.S.C. § 102 over Japanese Patent Publication

(1) Claim 12

Claim 12 also stands rejected under 35 U.S.C. §102 as being anticipated by Japanese Patent Publication No. 60049919 A to Furui Koichi. The Furui Koichi patent publication is cited as disclosing a blow-mold-fill-seal method for forming a container where a sterile barrier 12 is allegedly provided to cover the tube opening from its formation to its filling and has a sterile medium in the form of aseptic air pressure that is moved in the direction of the filler opening.

As described in the previously submitted English translation of the Japanese publication and illustrated in the drawings thereof, a parison 6 is delivered from the head 5 of an extruder 1 between the dies 8 of mold 3. As the mold dies are closed, the parison is cut by cutter 9 to form a filler opening. After the cutting, the mold 3 moves to the blowing and injection mandrel station

beneath the filling head 10 of the molding and filling device 2. Only after the mold has been moved under the blow molding and filling head 10 located in the sterile chamber 12 is the filler opening previously formed by the cutter 9 covered by that sterile chamber. At the cutting operation under the extruder head 5 and during the movement of the mold with the opened parison therein to its position under blow molding and filling head 10, the formed filler opening in the parison 6 is not so covered and is exposed to contaminates until it reaches its final position under mandrel 11 and sterile chamber 12.

In contrast, claim 12 requires a method step wherein the sterile barrier covers the filler opening in the tube from its formation. Since the filling opening in the Japanese patent publication is not covered by the sterile barrier from the time of its formation to its filling, the subject matter of claim 12 or claim 24 is not anticipated or rendered obvious by the cited Japanese patent publication.

(2) Claim 24

Claim 24 also stands rejected under 35 U.S.C. §102 as being anticipated by Japanese Patent Publication No. 60049919 A to Furui Koichi. The Furui Koichi patent publication is cited as disclosing a blow-mold-fill-seal method and apparatus for forming a container where a sterile barrier 12 is allegedly provided to cover the tube opening from its formation to its filling and has a sterile medium in the form of aseptic air pressure that is moved in the direction of the filler opening.

As described in the English translation and illustrated in the drawings of this Japanese publication, a parison 6 is delivered from the head 5 of an extruder 1 between the dies 8 of mold 3. As the mold dies are closed, the parison is cut by cutter 9 to form a filler opening. After the

cutting, the mold 3 moves to the blowing and injection mandrel station beneath the filling head 10 of the molding and filling device 2. Only after the mold has been moved under the blow molding and filling head 10 located in the sterile chamber 12 is the filler opening previously formed by the cutter 9 covered by that sterile chamber. At the cutting operation under the extruder head 5 and during the movement of the mold with the opened parison therein to its position under blow molding and filling head 10, the formed filler opening in the parison 6 is not so covered and is exposed to contaminates until it reaches its final position under mandrel 11 and sterile chamber 12.

In contrast, claim 24 requires that the sterile barrier cover the filler opening in the tube from its formation. Since the filling opening in the Japanese patent publication is not covered by the sterile barrier from the time of its formation to its filling, the subject matter of claim 24 is not anticipated or rendered obvious by the cited Japanese patent publication.

To support an anticipation rejection, all elements of the claim must be found in a single reference. In re Royka et al., 490 F.2d 981, 984, 180 USPQ 580, 582 (CCPA 1974). Rejections under 35 U.S.C. § 102 are proper only when the claimed subject matter is identically disclosed or described in the prior art. In re Marshall, 578 F.2d 301, 304, 198 USPQ 344, 346 (CCPA 1978). Since all elements of claims 12 and 24 are not identically disclosed or described in the Hansen German patent or the Japanese patent, the rejection under 35 U.S.C. § 102 is untenable.

Accordingly, claims 12 and 24 are patentably distinguishable over the cited patents.

(3) Rejections of Dependent Claims Based on Japanese Publication

Claims 13-14, 17, 20 and 22-23 and claim 25, being dependent upon claims 12 and 24, respectively, are also allowable for the above reasons. Moreover, these dependent claims recite additional features further distinguishing them over the cited patent document.

(a) Claim 13

Claim 13 is further distinguished by the sterile medium being sterile air, inner gas and/or hydrogen peroxide. Such is not shown to be anticipated in the claimed combination.

(b) Claim 14

Claim 14 is further distinguished by the sterile medium being conveyed at a specified over-pressure (i.e., above ambient air pressure). Again, the Japanese publication is cited for such overpressure, but is deficit in failing to disclose an overpressure being emanated from a movable sterile barrier, as claimed.

(c) Claim 17

Claim 17 is further distinguished by the sterile barrier being a plate-shaped cover element that provides the filler opening with sterile media until the container is filled below a sterile filling space. As noted above, the chamber of the Japanese patent does not provide a plate-shaped cover element, but is box-shaped.

(d) Claim 20

Claim 20 is further distinguished by the container being flushed across the filler opening by the sterile media. No such flushing is provided by a barrier that covers the filler opening from forming in the Japanese patent.

(e) Claims 22-23

Claims 22 and 23 are further distinguished by the specific temperature ranges recited therein. Such ranges are not anticipated within the claimed combination.

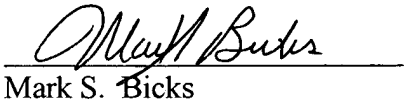
(f) Claim 25

Claim 25 is further distinguished by the media deliverer comprising outlet ports and at least one inlet port in a plate shaped cover element. No such inlet port is disclosed in the Japanese patent.

8. Conclusion

In view of the foregoing, Applicant-Appellant submits that the rejections of the claims under 35 U.S.C. §§ 112, 102(b) and 103 and are untenable. Thus, Applicant-Appellant requests that these rejections be reversed.

Respectfully submitted,



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Dated: April 13, 2009

APPENDIX A –CLAIMS ON APPEAL

12. A method of producing and filling containers, comprising the steps of:

extruding a tube of softened plastic material into an open mold;

closing the tube at a projecting end thereof by closing the mold to form a bottom of a container;

separating the tube above the mold by a separating element to form a filler opening;

moving the mold with the tube having the filler opening in the mold into a filling position;

after the tube is formed into the container by generating a pressure gradient acting on the tube in the mold to expand the tube, filling the container through the filler opening;

sealing the filler opening;

covering the filler opening by a sterile barrier at least from a formation time for the filler opening to filling of the tube; and

conveying at least one sterile medium in a direction of the filler opening from the sterile barrier by a media delivery device.

13. A method according to claim 12 wherein

the sterile medium is air, inert gas and/or hydrogen peroxide.

14. A method according to claim 12 wherein

the sterile medium is conveyed at a specified over-pressure in the direction of the filler opening.

15. A method according to claim 12 wherein

non-viable particles are exhausted by a suction device.

16. A method according to claim 15 wherein

the suction device is a vacuum device.

17. A method according to claim 12 wherein

the sterile barrier comprises a plate-shaped cover element that covers the filler opening after separation of the tube, and provides the filler opening with the sterile media until the container is filled below a sterile filling space.

18. A method according to claim 17 wherein

the cover element moves together with the separating element during separation of the tube, and does not clear the filler opening until filling of the container.

19. A method according to claim 17 wherein

the cover element moves synchronously with parts of the mold, and does not clear the filler opening until filling of the container.

20. A method according to claim 12 wherein

the container is flushed across the filler opening by the sterile medium by the media delivery device.

21 A method according to claim 12 wherein

the container is partially filled with the sterile medium by the media delivery device.

22. A method according to claim 12 wherein

the sterile barrier and the sterile medium are heated to a temperature higher than 120° C.

23. A method according to claim 12 wherein

the sterile barrier and the sterile medium are heated to a temperature in a range of 150° C to 200° C .

24. A device for producing and filling containers, comprising:

at least one mold having mold parts movable between open and closed positions;

an extruder for extruding at least one tube of softened plastic material in said mold with said mold parts in said open positions;

welding edges on said mold parts for welding a projecting end of the tube to form a container bottom;

a pressure gradient generator acting on and expanding the tube in said mold;

a movable separating element for forming a filler opening by separating the tube, said separating element being movable above the mold between a retracted position and an operating position;

a filling device in a sterile filling space;

a displacement device moving said mold between an extrusion position below said extruder and a filling position below said filling device in said sterile filling space;

a sterile barrier covering the filler opening of the tube in said mold from formation thereof to filling of the tube in said sterile filling space; and

a media deliverer, coupled to said sterile barrier, for conveying sterile medium in a direction of the filler opening.

25. A device according to claim 24 wherein

said sterile barrier comprises a plate-shaped cover element; and

said media deliverer comprises media outlet ports and at least one inlet port in said cover element.

26. A device according to claim 25 wherein

said media deliverer comprises a suction frame enclosing said cover element in at least one position of said cover element.

APPENDIX B - EVIDENCE

(1) U.S. Patent No. 7,200,975

(2) U.S. Patent No. 7,401,417

US007401417B2

(12) **United States Patent**
Rydell et al.

(10) **Patent No.: US 7,401,417 B2**
(45) **Date of Patent: Jul. 22, 2008**

(54) **METHOD AND A DEVICE FOR DRYING OR HEAT TREATMENT OF A WEB-FORMED MATERIAL**

(75) Inventors: **Ingemar Rydell**, Växjö (SE); **Ake Ringqvist**, Kalvsvik (SE); **Heikki Salo**, Växjö (SE)

(73) Assignee: **Andritz Fiber Drying Aktiebolag**, Vaxjo (SE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 42 days.

(21) Appl. No.: **10/539,398**

(22) PCT Filed: **Dec. 16, 2003**

(86) PCT No.: **PCT/EP03/14316**

§ 371 (c)(1),
(2), (4) Date: **Dec. 15, 2005**

(87) PCT Pub. No.: **WO2004/057254**

PCT Pub. Date: **Jul. 8, 2004**

(65) **Prior Publication Data**

US 2006/0150434 A1 Jul. 13, 2006

(30) **Foreign Application Priority Data**

Dec. 20, 2002 (SE) 0203803

(51) **Int. Cl.**
F26B 3/06 (2006.01)

(52) **U.S. Cl.** **34/487**; 34/451; 34/507; 34/510

(58) **Field of Classification Search** 34/77, 34/78, 636, 638, 639, 209, 210, 212, 218, 34/219, 451, 487, 507, 510, 131; 432/59, 432/72

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,849,904	A	11/1974	Villalobos	34/155
4,133,636	A *	1/1979	Flynn	34/636
4,253,247	A	3/1981	Bergstrom	34/155
4,365,423	A	12/1982	Arter et al.	34/23
4,977,687	A	12/1990	Boissevain	34/51
5,337,586	A *	8/1994	Ronchi	34/638
5,967,770	A *	10/1999	Heine et al.	432/59
6,735,882	B2 *	5/2004	Takahashi	34/636

* cited by examiner

Primary Examiner—Jiping Lu
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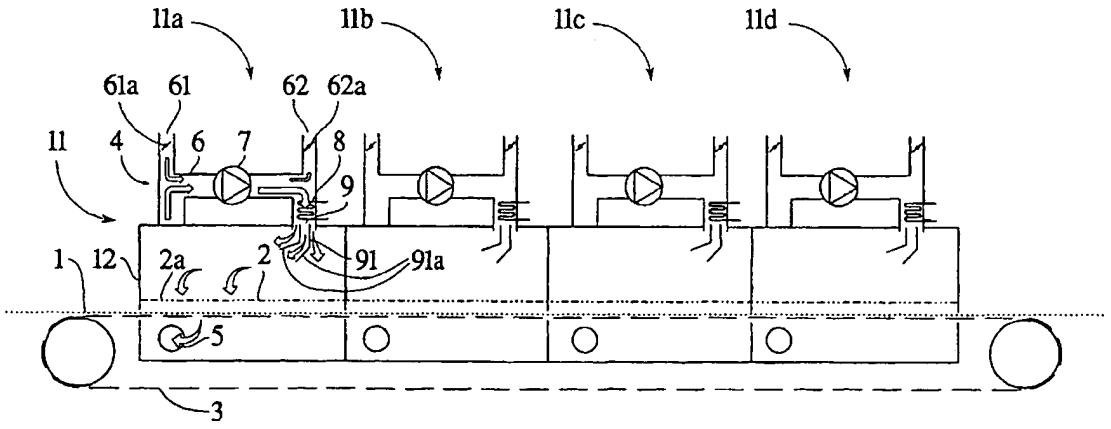
(57) **ABSTRACT**

When drying a web-formed material, the web-formed material is passed, in contact with a gas-permeable dryer screen, through a drying plant. One or more fans blow hot process air against, and through, the web-formed material in order to dry it. A chamber, surrounding the fan or the fans, has a limiting surface that is essentially parallel to the surface of the web-formed material. This limiting surface has an opening that extends essentially across the whole width of the web-formed material. A distributing member, in the form of an arcuate perforated, sheet-formed element, placed outside the chamber, covers the opening completely. With the distributing member a first flow of process air is divided into a large number of jets, distributed over essentially the whole of the angular area that faces the web-formed material. Thereafter, the jets are allowed to mix with one another again to form a second flow of process air, which is passed through a flat perforated, sheet-formed element that is positioned close to and extends over essentially the whole of the web-formed material, and then against and through the web-formed material lying on the gas-permeable dryer screen.

9 Claims, 3 Drawing Sheets



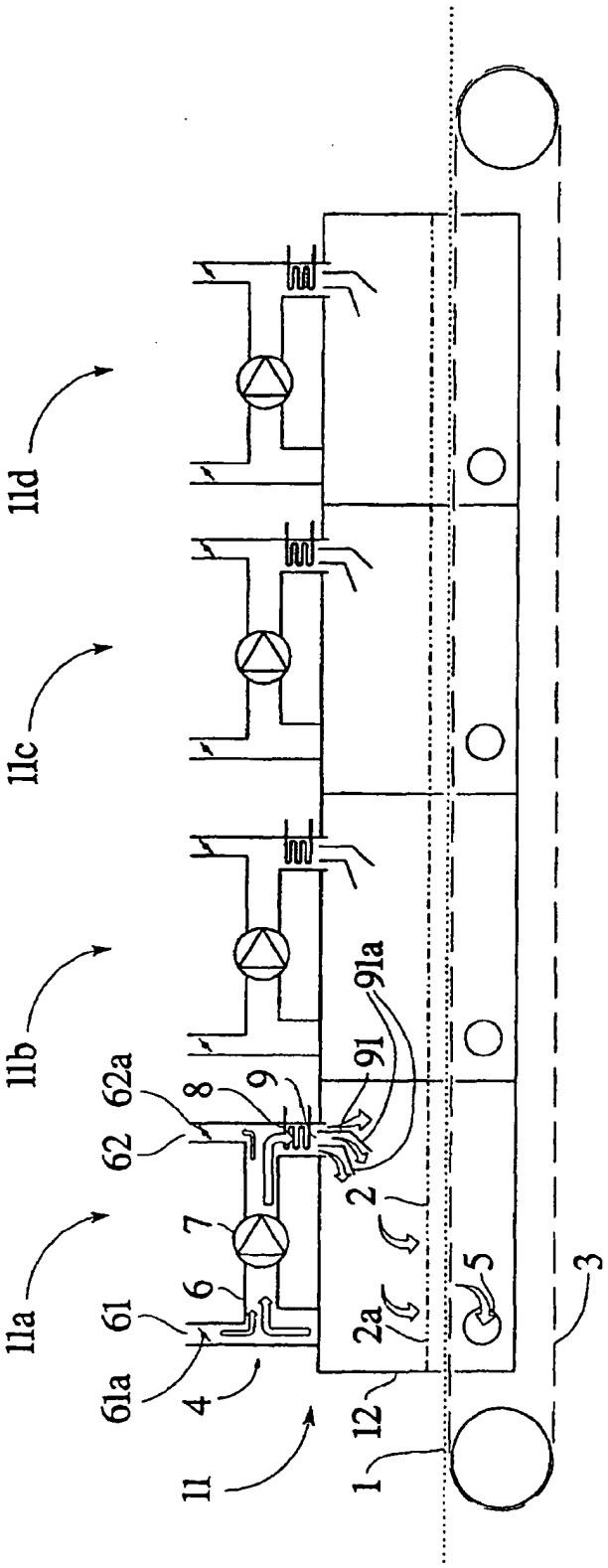


Fig. 1

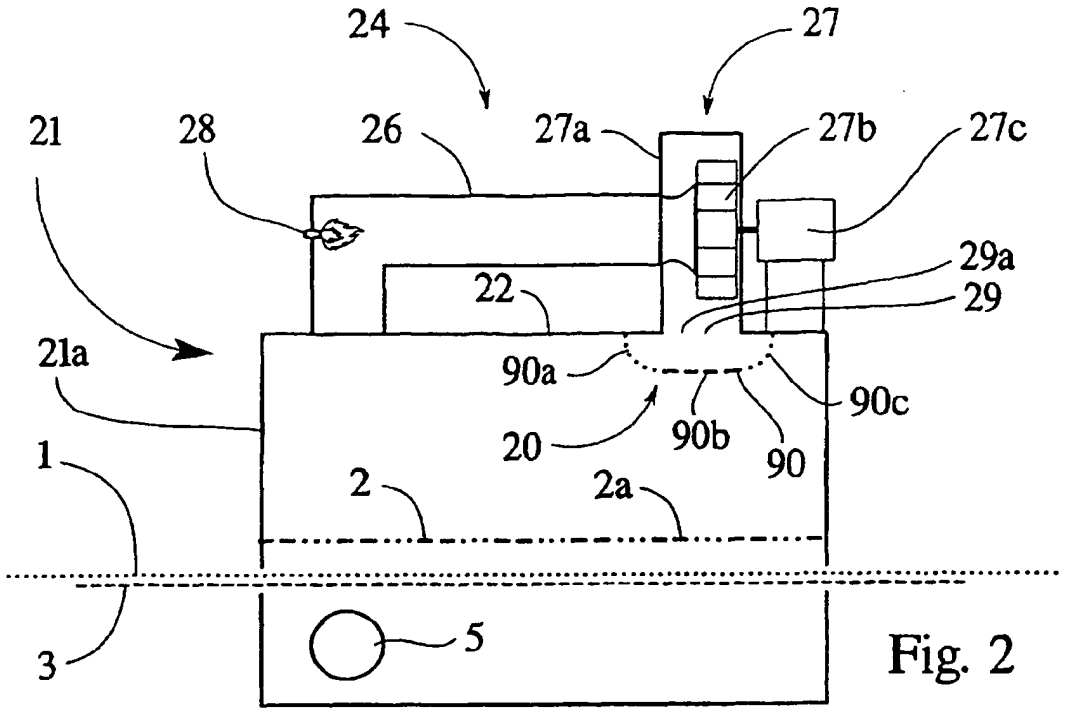

24
27
21
28
26
27a
27b
27c
29a
29
22
21a
90a
90c
20
90b
90
1
2
2a
3
5

Fig. 2

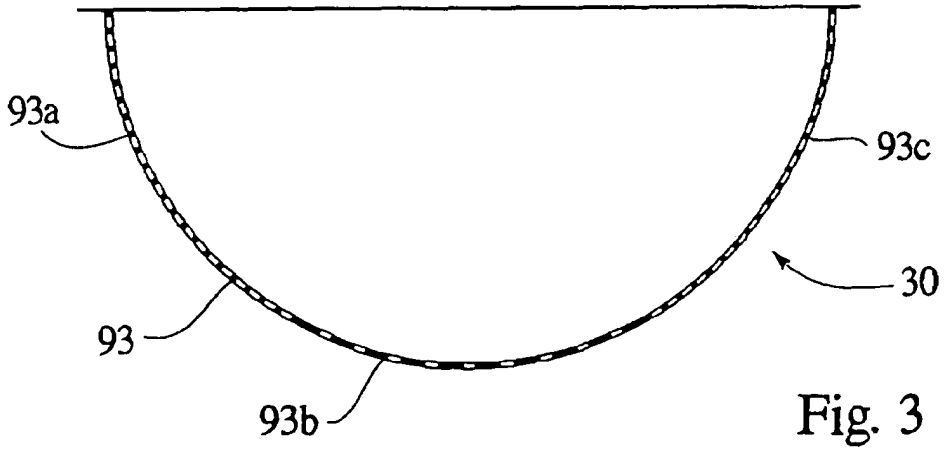

93a
93c
30
93
93b

Fig. 3

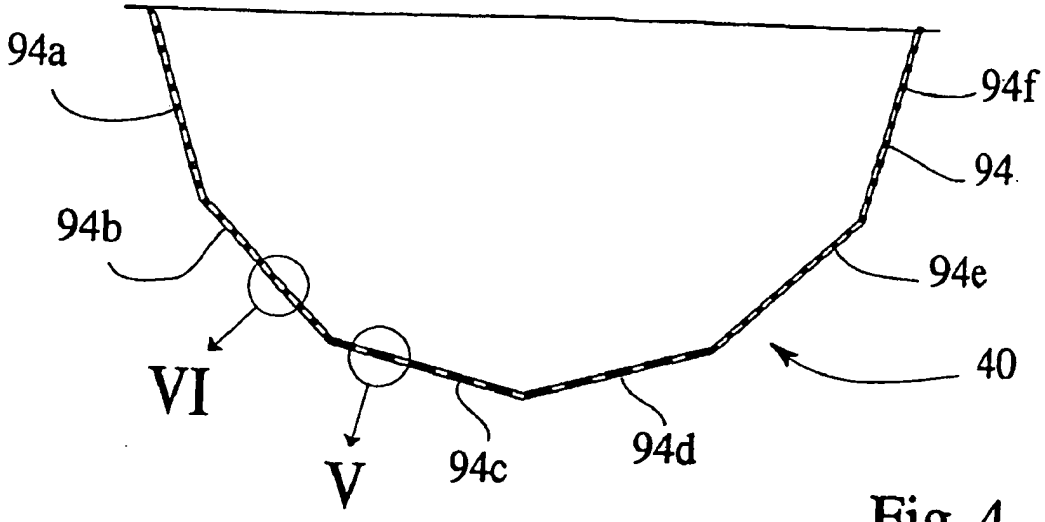


Fig. 4

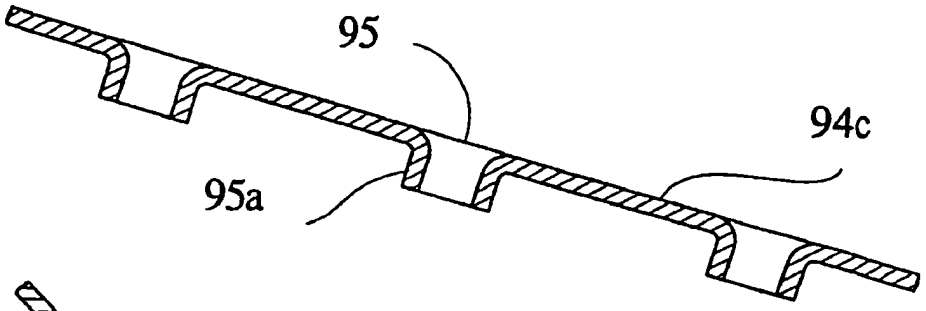


Fig. 5

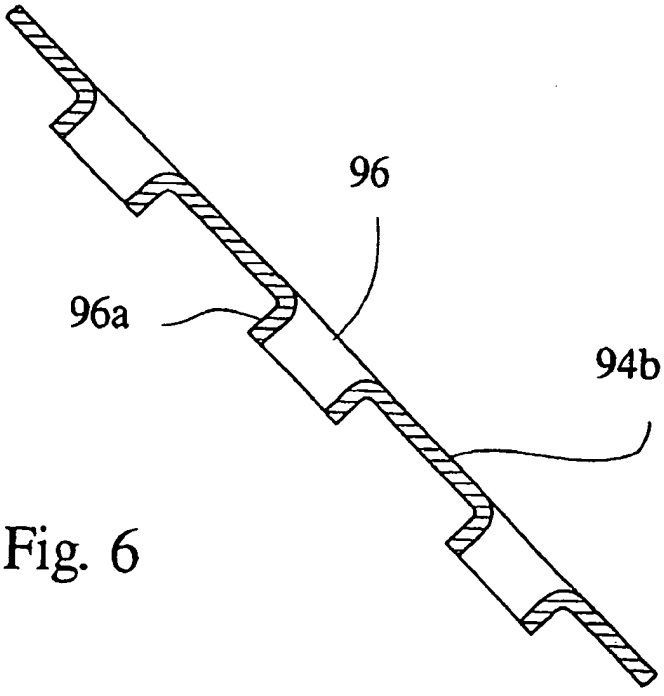


Fig. 6

METHOD AND A DEVICE FOR DRYING OR HEAT TREATMENT OF A WEB-FORMED MATERIAL

CROSS-REFERENCE TO RELATED APPLICATIONS

This is the national stage of International Application No. PCT/EP2003/014316 filed Dec. 16, 2003 and which designated the United States.

Technical Field

The present invention relates to a method for drying or heat treatment of a web-formed material, preferably glass fibre. The web-formed material is passed, in contact with a gas-permeable dryer screen, through a drying plant. Hot process air is blown against, and through, the web-formed material, in order to dry and/or heat-treat said material.

For the purpose of obtaining an equalized velocity distribution of the process air through the web-formed material, a pressure drop is generated in a zone which, on the high-pressure side of the web-formed material, lies close to and extends across essentially the whole web-formed material.

Distribution members serve to distribute the process air in the region upstream of this pressure-drop zone.

The present invention also relates to a device suitable for carrying out the method.

BACKGROUND

Web-formed materials, such as paper or pulp, are usually dried either in a contactless manner by blowing hot air against the web-formed material, or by contact with heated surfaces, primarily cylinders.

In cylinder drying of a web-formed material, for example paper, the web-formed material is heated by heated cylinders against which the web-formed material is pressed by the web tension and/or with the aid of a felt or a dryer screen.

In contactless drying, the web-formed material is usually passed back and forth through a plurality of drying decks, floating between upper and lower blow boxes, which blow out hot process air against the web-formed material, in order to dry said material.

If the web-formed material is sufficiently porous, one useful method is to blow and/or suck process air or other suitable drying medium through the material, so-called through drying. The web-formed material is then suitably supported by a gas-permeable dryer screen or by perforated cylinders during the drying. Through drying is suitable for drying, for example, soft crepe paper (soft tissue, non-woven) and glass fibre. The concept drying is used in a broad sense in the following so that it also includes extraction of steam other than water and supply of heat for the purpose of, for example, curing a binder or achieving other chemical changes.

The water (or other substance) which, in the form of steam, leaves the web-formed material is mixed with and discharged by the process air. To be able to retain the drying effect, therefore, part of the process air must be discharged as exhaust air and be replaced by drier and preferably hot supply air. This, of course, occurs to such a limited extent that such a high moisture content is maintained in the exhaust air that condensation and corrosion on exposed parts can only just be avoided. The main part of the process air is recirculated.

The process air is heated by the supply of heat to the mixture of supply air and recirculated process air. This often takes place by recuperative heat exchange, where the heating medium is low-pressure steam or medium-pressure steam, but may also take place in other ways, for example by means of one or more gas burners placed directly in the recirculation flow. In case of an increased drying requirement, the supply of heat is increased and in case of a decreased drying requirement, the supply of heat is reduced.

In through drying, the distribution of the velocity and temperature of the process air over the surface of the web are very sensitive parameters. This is true to a particularly high degree when drying a wet-formed glass-fibre web. To ensure, as far as possible, at least a uniform velocity distribution, a perforated plate or the like is usually placed near the web-formed material on the upstream side. With this plate, a pressure drop is created which equalizes the differences in velocity to a certain extent. The higher the pressure drop, the better the equalization.

Increasing quality demands, however, have led to a situation where it is now difficult to fulfil the demands made with reasonable pressure drops.

It is a first object of the present invention to provide a through dryer for the web-formed material.

It is a second object of the present invention to provide a through dryer for a web-formed material, which dryer, with reduced pressure drop, achieves the desired conditions as regards distribution of velocity through the web-formed material.

It is a third object of the present invention to provide a through dryer for a web-formed material which fulfils higher demands as regards distribution of velocity through the web-formed material than what can be achieved using conventional technique.

It is a fourth object of the present invention to provide a through dryer for a web-formed material which permits the dried web-formed material to fulfil higher demands than what can be achieved using conventional technique.

SUMMARY OF THE INVENTION

The present invention relates to a method for drying and/or heat treatment of a web-formed material, preferably glass fibre. The web-formed material is passed, in contact with a gas-permeable dryer screen, through a drying plant. Hot process air is blown against, and sucked through, the web-formed material in order to dry or heat said material.

The water, or other substances, which in the form of steam leaves the web-formed material, is mixed with and discharged by the process air, at least part of which is recirculated whereas the non-recirculated process air is discharged as exhaust air and is replaced by a corresponding part of supply air with a low water content.

In order to obtain an equalized velocity distribution of the process air through the web-formed material, a pressure drop is generated in a zone which, on the high-pressure side of the web-formed material, lies close to and extends across essentially the whole web-formed material.

Distribution members are used to distribute the process air in the region upstream of said pressure-drop zone.

According to the present invention, a first flow of process air is formed, with a cross section extending essentially across the whole width of the web-formed material and the extent of which along the direction of movement of the web-formed material is considerably smaller than its extent perpendicular to the direction of movement of the web-formed material. This first flow has a direction of flow that is essentially perpendicular to the surface of the web-formed material.

The first flow of process air is divided into a large number of jets directed essentially in a plane defined by the direction

of movement and the normal direction of the web-formed material, said jets being distributed over essentially the whole angular region facing the web-formed material. Thereafter, the jets are allowed to be mixed with one another again into a second flow of process air which is conducted through the pressure-drop zone and then against and through the web-formed material lying on the gas-permeable dryer screen.

The present invention also relates to a device for drying or heat treatment of a web-formed material, preferably glass fibre, comprising a gas-permeable dryer screen for transporting the web-formed material, as well as one or more fans blowing hot process air against, and sucking it through, the web-formed material, in order to dry or heat said material.

A chamber, surrounding the fan or fans, extends essentially across the whole width of the web-formed material. One or more distribution members, preferably located relatively near the fans, are adapted to distribute the process air.

Means generating a pressure drop, located on the high-pressure side of the web-formed material, lie close to and extend over essentially the whole web-formed material.

According to the present invention, the chamber has a limiting surface that is essentially parallel to the surface of the web-formed material. This limiting surface has an opening extending essentially across the whole width of the web-formed material. The extent of the opening along the direction of movement of the web-formed material is considerably smaller than its extent perpendicular to the direction of movement of the web-formed material. A distribution member, placed outside the chamber, covers the opening entirely. The distribution member consists of an arcuate perforated, sheet-formed element. The pressure-drop generating member consist of a plane perforated, sheet-formed element.

The present invention thus relates to a method and a device for so-called through drying of a web-formed material, preferably glass fibre. The drying of the web-formed material takes place at least substantially inside a housing that completely or essentially completely surrounds the drying plant. The drying plant is divided into several sections, through which the web-formed material is consecutively passed on a gas-permeable dryer screen.

In a loop that is separate for each section of the drying plant, the main part of the used process air is recirculated, mixed with supply air and heated to the desired temperature. The heating is often performed recuperatively, but may also be performed with one or more gas burners directly in the process-air flow. The magnitude of the flow is determined by fans placed downstream of the heating but upstream of the web-formed material, so that over pressure is applied only to the region between the fans and the web-formed material whereas underpressure prevails below the web-formed material and in the recirculation loop itself.

The fans are preferably radial fans, which on their high-pressure side have a chamber from which the process air flows against and through the web-formed material resting on the gas-permeable dryer screen.

The chamber has an opening facing the web-formed material.

The opening is placed in, or constitutes, one of the limiting surfaces of the chamber. The chamber may thus be completely without one wall and for this reason the theoretical delimitation of the chamber is called a limiting surface.

The opening has an extent along the direction of movement of the web-formed material that is considerably smaller than its extent perpendicular to the direction of movement of the web-formed material; it is preferably formed as a rectangle with its long sides perpendicular to the direction of movement of the web-formed material, and especially it may be formed by the extent of the chamber. A first flow of process air, with a direction of flow essentially perpendicular to the surface of the web-formed material, is conducted through this opening.

This first flow of process air is divided into a large number of jets directed essentially in a plane defined by the direction of movement and the normal direction of the web-formed material, the jets being distributed over essentially the whole of the angular region facing the web-formed material. The jets have thus essentially no component in a direction perpendicular to the direction of movement of the web-formed material lying in the plane of the web.

The division is performed with the aid of a distribution member that is placed outside the chamber and completely, or essentially completely, covers the opening. The distribution member is in the form of an arcuate perforated, sheet-formed element, for example a perforated plate.

The arcuate perforated, sheet-formed element is suitably, wholly or partially, formed as part of the envelope surface of a straight cylinder. It may, for example, be formed as part of the envelope surface of a straight circular cylinder, preferably essentially as half the envelope surface of a straight circular cylinder. It may also be formed as part of the envelope surface of a straight polygonal cylinder, for example as part of the envelope surface of a straight polygonal cylinder composed of essentially plane sub-elements, preferably essentially as half the envelope surface of a straight regular, polygonal cylinder.

The degree of perforation, in the arcuate perforated, sheet-formed element, should be lower in a central portion than at the sides. The perforation, in the arcuate perforated sheet-formed element, suitably consists of essentially circular holes which are formed with a rounded inlet and terminate in a neck projecting into the direction of flow of the process air.

With this distribution member, a large number of jets with essentially circular cross section are formed, and the jets are directed a certain distance after the first flow has been divided.

This distribution should take place such that the first flow of process air is divided into a large number of jets directed so that their paths do not intersect one another, preferably so that they are essentially isotropically outwardly-directed. The division may be made so that they are directed, section by section, in the same direction and/or so that the angular difference between two jets increases with the distance between the jets measured in the machine direction of the web-formed material.

The jets in a central section are suitably essentially anti-parallel to a normal to the web-formed material and other sections exhibit deviating directions with a successively increasing angle to the jets in the central section.

The degree of perforation in the arcuate sheet-formed element should be adapted such that the ratio of the total cross-section area of the jets to the total area is lower in a central portion, where the direction of the jets is essentially perpendicular to the web-formed material, than at the sides, where the direction of the jets lies essentially in the plane of the web-formed material. The optimal distribution of the holes and the size thereof will vary depending on the geometrical conditions.

When the first flow of process air, in the distribution member, has been divided into a large number of jets distributed in the manner described above, the jets are allowed to mix with one another again into a second flow of process air, which is conducted through the pressure-drop zone, through the pressure-drop generating member which suitably consists of a plane perforated, sheet-formed element, and then against and through the web-formed material lying on the gas-permeable dryer screen.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in greater detail with reference to the accompanying drawings, wherein

FIG. **1** schematically shows the principle of a prior-art drying plant for a web-formed material;

FIG. **2** schematically shows a section of a drying plant designed according to the present invention;

FIG. **3** schematically shows a first distribution member designed according to the present invention;

FIG. **4** schematically shows a second distribution member designed according to the present invention;

FIG. **5** shows a first detail of the distribution member according to FIG. **4**; and

FIG. **6** shows a second detail of the distribution member according to FIG. **4**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** shows a simplified side view of a drying plant **11** for a glass-fibre web **1**. The drying plant **11** is enclosed in a housing **12** and comprises four drying sections **11***a*, **11***b*, **11***c*, **11***d*, separated by partitions. The glass-fibre web **1** is passed through the drying plant **11** in contact with a gas-permeable dryer screen **3**, for example made of bronze. Associated with each drying section **11***a* etc. is a recirculation loop **4** comprising an inlet **5**, a recirculation channel **6**, a recirculation fan **7**, a heater battery **8**, and an outlet **9** in the roof of the housing **12**. Above the glass-fibre web **1**, at a distance of approximately 130 mm, there is a pressure-drop generating member **2** in the form of a perforated plate **2***a*.

The recirculation loop **4** is provided with an inlet **61** for supply air and an outlet **62** for exhaust air. A first control device **61***a* is mounted at the inlet **61**, and a second control device **62***a* is mounted at the outlet **62**.

The outlet **9** of the recirculation loop **4** is provided with a distribution member **91** consisting of guide vanes **91***a*.

FIG. **2** shows in simplified form a section **21***a* of a drying plant **21**, enclosed in a housing **22** and designed according to the present invention. Associated with the drying section **21***a* is a recirculation loop **24** comprising an inlet **5**, a recirculation channel **26**, a gas burner **28**, a radial fan **27**, a chamber **27***a* surrounding the impeller **27***b*, and an outlet **29** in the roof of the housing **22**, as well as an inlet (not shown) for supply air and an outlet (not shown) for used process air.

The fan **27** is driven by an electric motor **27***c*. The outlet **29** of the recirculation loop **24** consists of an opening **29***a* in the chamber **27***a*, which is completely open downwards and thus has no floor.

The outlet **29** of the recirculation loop **24**, that is, the opening **29***a* in the chamber **27***a* which is completely open downwards, is covered by a distribution member **20** in the form of an arcuate perforated plate **90** divided into three sections **90***a*, **90***b*, **90***c*. The central section **90***b* has a lower degree of perforation than the side sections **90***a* and **90***c*, although the difference is exaggerated to make it more clear.

The opening **29***a* has an extent along the direction of movement of the web-formed material that is considerably smaller than its extent perpendicular to the direction of movement of the web-formed material. It is preferably formed as a rectangle with its long sides perpendicular to the direction of movement of the web-formed material, and especially it may be formed by the extent of the chamber. A first flow of process air, with a direction of flow essentially perpendicular to the surface of the web-formed material, is conducted through this opening.

This first flow of process air is divided into a large number of jets directed essentially in a plane defined by the direction of movement and the normal direction of the web-formed material, the jets being distributed over essentially the whole of the angular region facing the web-formed material. The jets have thus essentially no component in a direction perpendicular to the direction of movement of the web-formed material lying in the plane of the web.

The division is performed with the aid of a distribution member that is placed outside the chamber and completely, or essentially completely, covers the opening. The distribution member is in the form of an arcuate perforated, sheet-formed element, for example a perforated plate.

FIG. **3** shows, in somewhat more detail, the section through a first distribution member **30** in the form of a perforated plate **93** that constitutes half the envelope surface of a circular cylinder. The envelope surface is divided into three sections **93***a*, **93***b*, **93***c*. The central section **93***b* has a lower degree of perforation than the side sections **93***a* and **93***c*, although the difference is exaggerated to make it more clear.

FIG. **4** shows, also in somewhat more detail, the section through a second distribution member **40** in the form of a perforated plate **94** that constitutes half the envelope surface of a cylinder, the cross section of which is a regular dodecagon. The envelope surface is divided into six sections **94***a*, **94***b*, **94***c*, **94***d*, **94***e*, **94***f*. The two central sections **94***c*, **94***d* have a lower degree of perforation than the four side sections **94***a*, **94***b*, **94***e*, **94***f*, although the difference is exaggerated to make it more clear.

FIG. **5** shows an enlarged detail of a section through the section **94***c* of the perforated plate **94** shown in FIG. **4**. The detail shows three circular holes **95** with necks **95***a* pointing in the direction of flow. The proportions are somewhat distorted to make it more clear. The degree of perforation is approximately 6%.

FIG. **6** shows an enlarged detail of a section through the section **94***b* of the perforated plate **94** shown in FIG. **4**. The detail shows three circular holes **96** with necks **96***a* pointing in the direction of flow. The proportions are somewhat distorted to make it more clear. The degree of perforation is approximately 8%.

The mode of operation of the invention is as follows.

The fan **27** creates an overpressure in the chamber **27***a* and hence blows a first flow of hot process air through the opening **29** against the distribution member **20**. In the distribution member **20**, the first flow is divided into a large number of jets passing through the holes in the arcuate perforated, sheet-formed element **90**. Downstream of the distribution member **20**, the jets are mixed into a second flow of process air flowing against the plane perforated plate **2***a* which distributes the flow over the web-formed material **1**.

The fan **27** also creates an underpressure below the gas-permeable dryer screen **3**, and this underpressure sucks the process air through the web-formed material **1** and the gas-permeable dryer screen **3**. The process air is further sucked in, as a recirculation flow, through the inlet **5** and via the recirculation channel **26** past the gas burner **28**, where the recirculation flow is heated to the desired temperature, back to the fan **27**. Upstream of the gas burner **28**, a part-flow is taken out as exhaust air, below the dryer screen **3**, and dry air is added, in the recirculation channel **26**, in a manner not shown.

The invention is not, of course, limited to the embodiments described above but may be varied in a plurality of ways within the scope of the appended claims.

Thus, for example, both the shape and the degree of perforation of the arcuate perforated, sheet-formed element (**90**, **93**, **94**) may be varied in a plurality of ways depending on the

outer geometry and other circumstances, and the recirculation air may be heated by indirect (recuperative) heat transfer by means of, for example, a steam battery.

What is claimed is:

1. A method for drying or heat treating a web-formed material having a width, the method comprising:

transporting the web-formed material, in contact with a gas-permeable dryer screen, through a drying plant in a direction of transport;

establishing high and low-pressure sides of the web-formed material by blowing a hot process air against the web-formed material and drawing the process air through the web-formed material, to dry said material;

mixing water leaving the web-formed material with the process air;

discharging a first portion of the mixed water and process air as exhaust air and replacing the exhaust air with a corresponding portion of supply air with a low water content;

recirculating a second portion of the mixed water and process air;

generating a pressure drop in a zone disposed proximate to the high-pressure side of the web-formed material, the zone extending substantially the width of the web-formed material; and

distributing the process air in a region upstream of the pressure-drop zone with a distribution member, the distribution member

forming a first flow of process air having a width extending substantially across the width of the web-formed material and a length in the direction of transport of the web-formed material, the length of the first flow of process air being smaller than the width of the first flow of process air, the first flow of process air having a direction of flow substantially perpendicular to the surface of the web-formed material,

dividing the first flow of process air into a plurality of jets directed substantially in a plane defined by the direction of transport and the normal direction of the web-formed material, said jets being distributed over substantially an angular region facing the web-formed material, and

mixing the jets with one another again into a second flow of process air, the second flow of process air being conducted through the pressure-drop zone and then against and through the web-formed material lying on the gas-permeable dryer screen.

2. The method of claim 1 wherein dividing the first flow of process air includes directing substantially all of the jets such that the jet paths do not intersect one another.

3. The method of claim 2 wherein the jets are substantially isotropically outwardly-directed.

4. The method of claim 2 wherein the jets are section by section, directed in the same direction.

5. The method of claim 2 wherein the first flow of process air is divided such that a ratio of the total cross-section area of the jets to the total area is lower in a central portion, where the direction of the jets is substantially perpendicular to the web-formed material, than at the sides, where the direction of the jets lies substantially in the plane of the web-formed material.

6. The method of claim 2 wherein dividing the first flow of process air includes forming the jets with an substantially circular cross section.

7. The method of claim 6 wherein the jets are directed a certain distance after the first flow has been divided.

8. The method of claim 1 wherein dividing the first flow of process air includes directing the jets such that the angular difference between two jets increases with the distance between the jets measured in the direction of transport of the web-formed material.

9. The method of claim 1 wherein dividing the first flow of process air includes directing the jets such that the jets in a central section are antiparallel to a normal to the web-formed material and jets in any other sections exhibit deviating directions with a successively increasing angle to the jets in the central section.

* * * * *

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(12) **United States Patent**
Till

(10) **Patent No.: US 7,200,975 B2**
(45) **Date of Patent: Apr. 10, 2007**

(54) **BEVERAGE BOTTLING PLANT FOR FILLING BOTTLES WITH A LIQUID BEVERAGE FILLING MATERIAL, HAVING A TRANSFER DEVICE FOR THE TRANSFER OF CONTAINERS FROM A TRANSFER STARWHEEL TO THE CAROUSEL OF A CONTAINER HANDLING MACHINE**

(75) Inventor: **Volker Till**, Hofheim/Taunus (DE)

(73) Assignee: **KHS Maschinen-und Anlagenbau AG**, Dortmund (DE)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/954,012**

(22) Filed: **Sep. 29, 2004**

(65) **Prior Publication Data**

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(30) **Foreign Application Priority Data**

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(51) **Int. Cl.**
B65B 3/04 (2006.01)

(52) **U.S. Cl.** ..... **53/253**; 53/111 RC; 53/167; 53/281; 53/300; 53/367; 198/441

(58) **Field of Classification Search** ..... 53/111 RC, 53/266.1, 415, 510, 167, 201, 282, 300, 253; 141/9, 101; 198/441
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,975,260	A *	8/1976	Peyton et al.	209/524
4,094,411	A *	6/1978	Kronseder et al.	209/522
4,114,347	A *	9/1978	Morris et al.	53/300
4,295,558	A *	10/1981	Heckmann	198/367
4,467,908	A *	8/1984	Schneider	198/441
4,721,200	A *	1/1988	Dugan	198/480.1
4,939,890	A *	7/1990	Peronek et al.	53/486
5,261,207	A *	11/1993	Bedin	53/284.5
5,501,552	A *	3/1996	Simkowski	406/52
5,713,403	A *	2/1998	Clusserath et al.	141/101
5,732,528	A *	3/1998	Peronek et al.	53/201
6,446,781	B1 *	9/2002	De Villele	198/364
6,591,967	B1 *	7/2003	Doudement et al.	198/450

FOREIGN PATENT DOCUMENTS

DE	103 26 618 A1	1/2005
DE	103 40 365 A1	3/2005

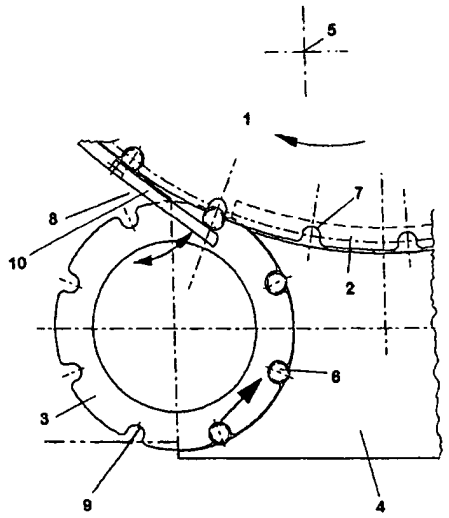
* cited by examiner

Primary Examiner—Thanh Truong
(74) *Attorney, Agent, or Firm*—Nils H. Ljungman & Associates

(57) **ABSTRACT**

A beverage bottling plant for filling bottles with a liquid beverage filling material, having a transfer device for the transfer of containers from a transfer starwheel to the carousel of a container handling machine. A transfer device for container handling machines such as fillers, rinsers or cappers for the handling of containers with a neck ring, with a circulating carousel on which there are handling spaces for the container, with at least one infeed starwheel, whereby the transfer device comprises a rigid transfer arm and optionally a drive system to move the transfer arm back and forth.

20 Claims, 13 Drawing Sheets



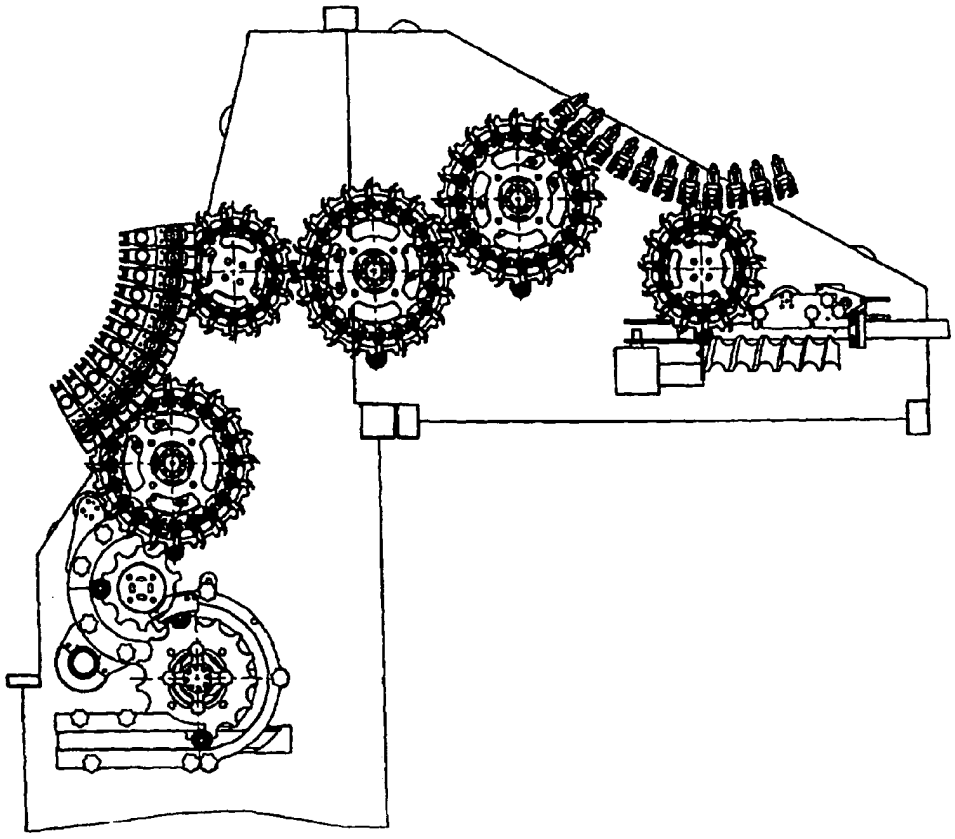


FIG. 1

PRIOR ART

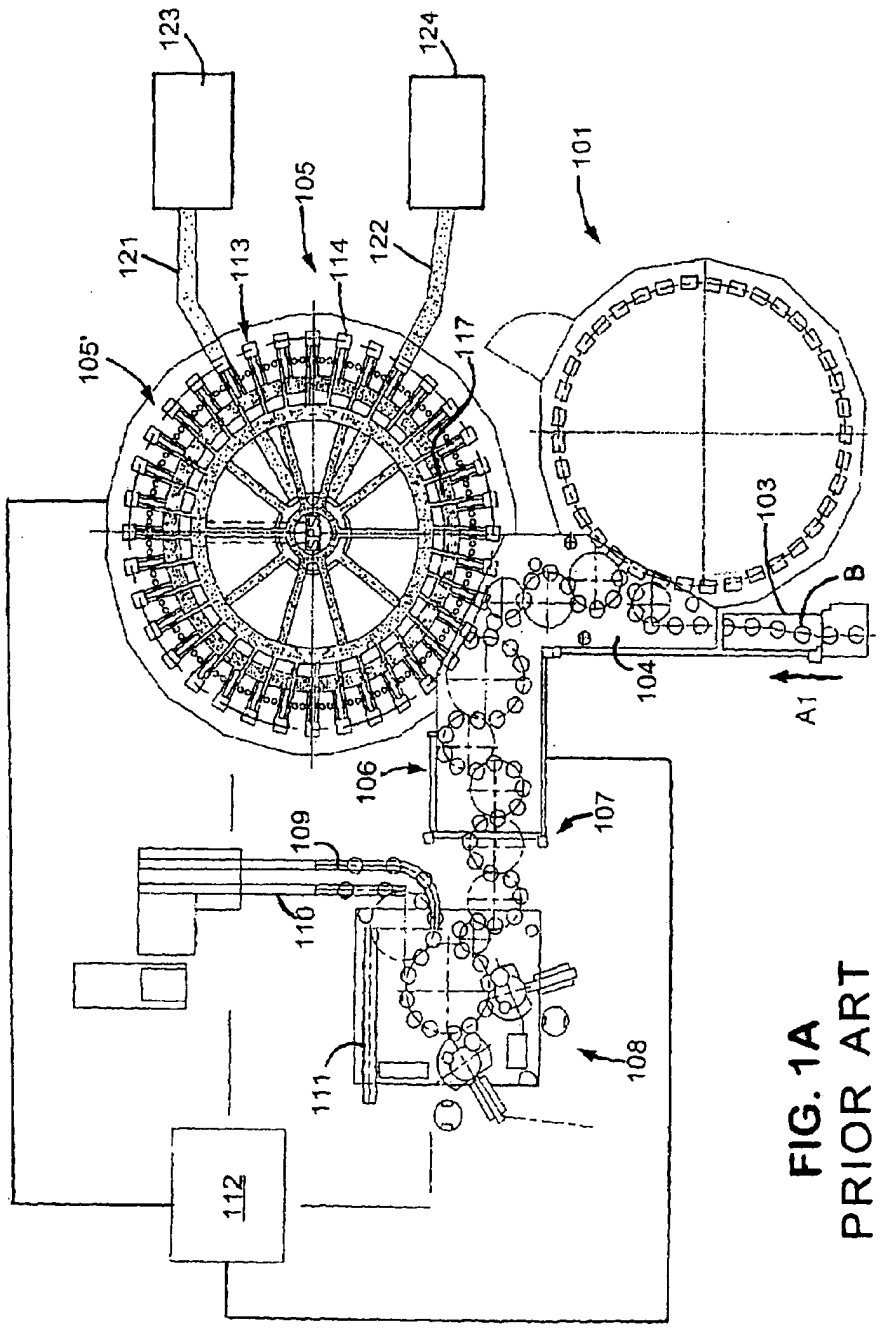


FIG. 1A
PRIOR ART

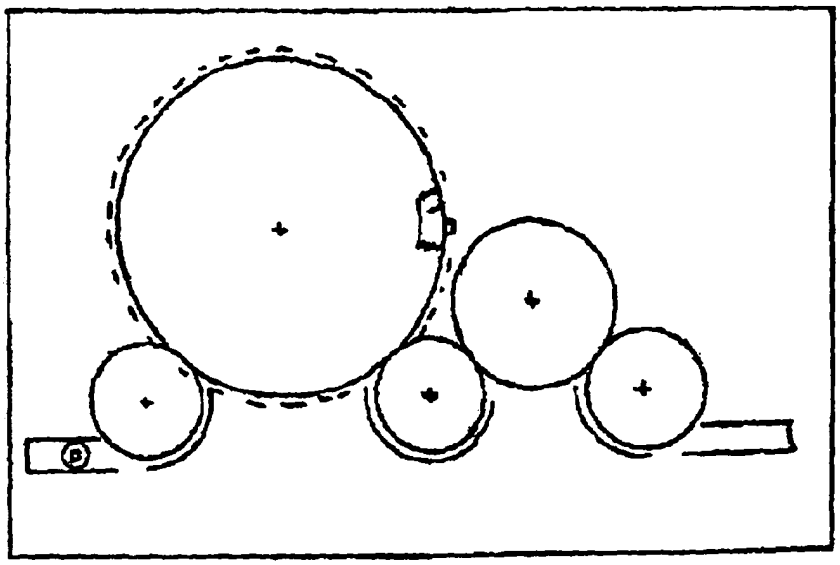


FIG. 1B

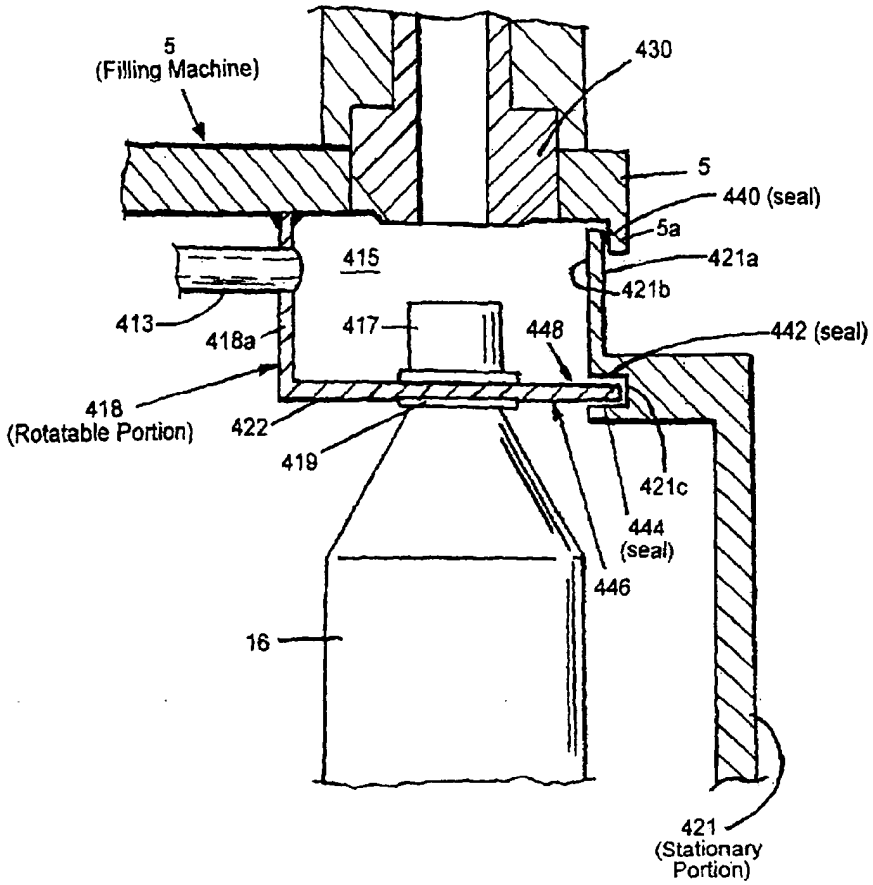

5
(Filling Machine)
430
5
440 (seal)
5a
421a
421b
415
413
418a
417
448
442 (seal)
418
(Rotatable Portion)
422
419
421c
444
(seal)
446
16
421
(Stationary
Portion)

FIG. 1C

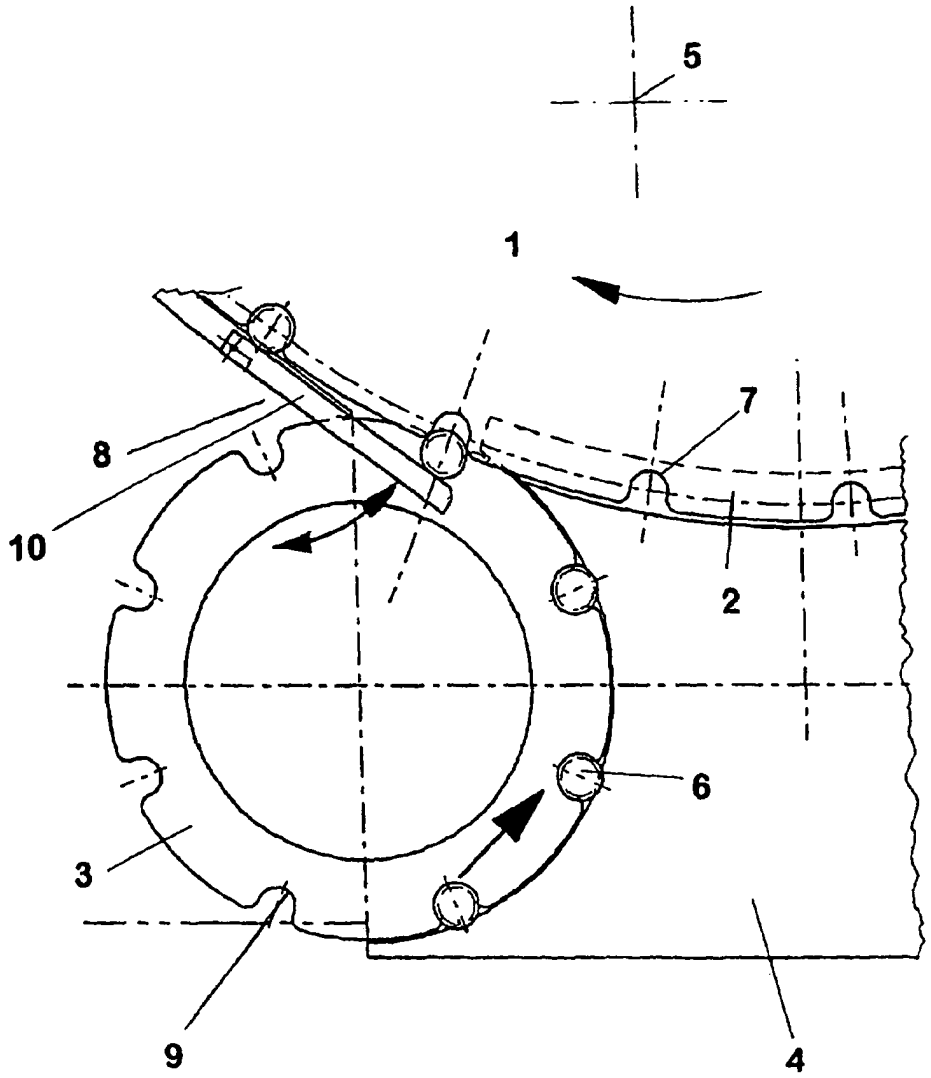
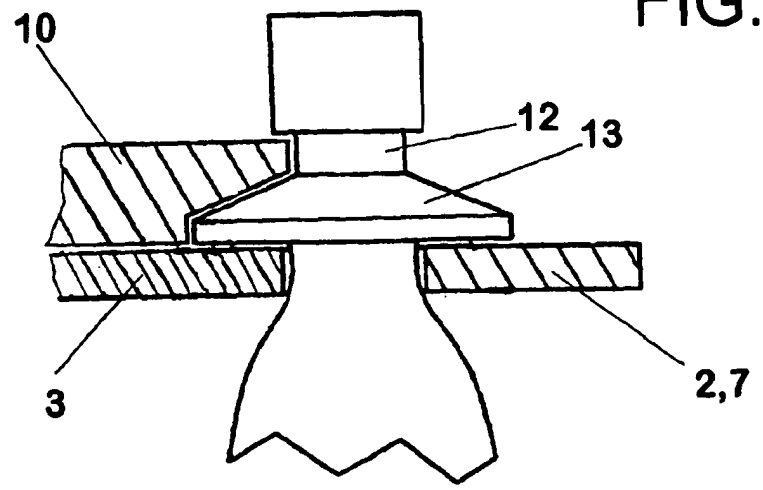


FIG. 2

FIG. 3



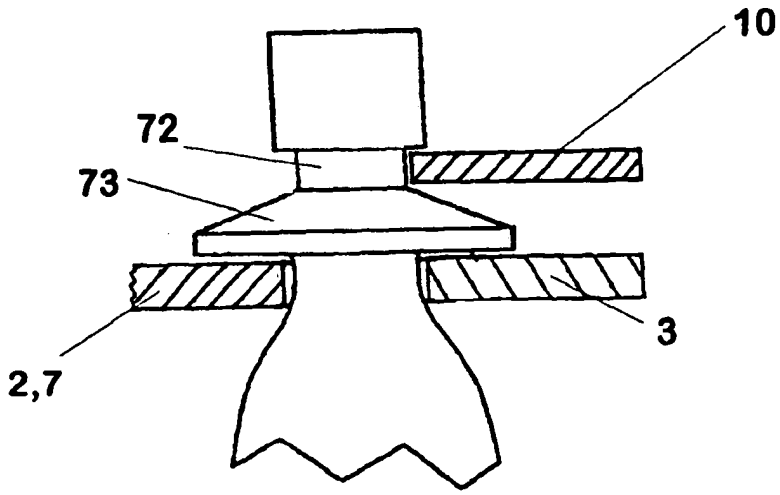


FIG. 4

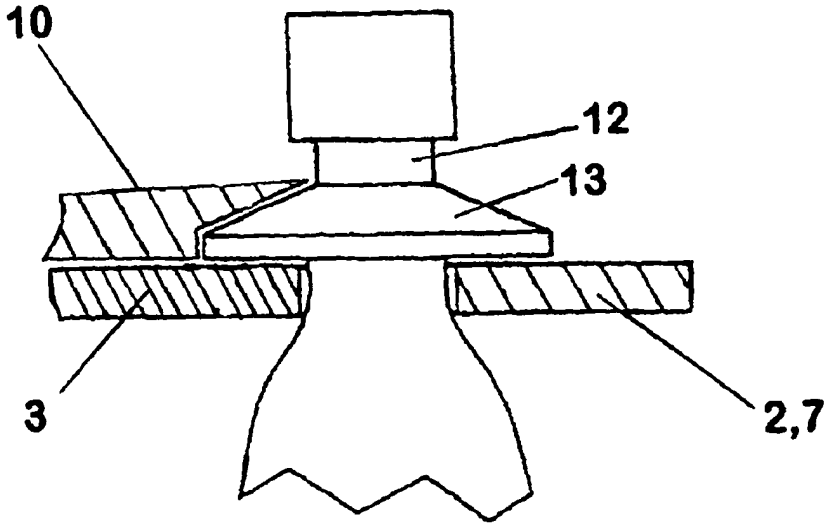


FIG. 3A

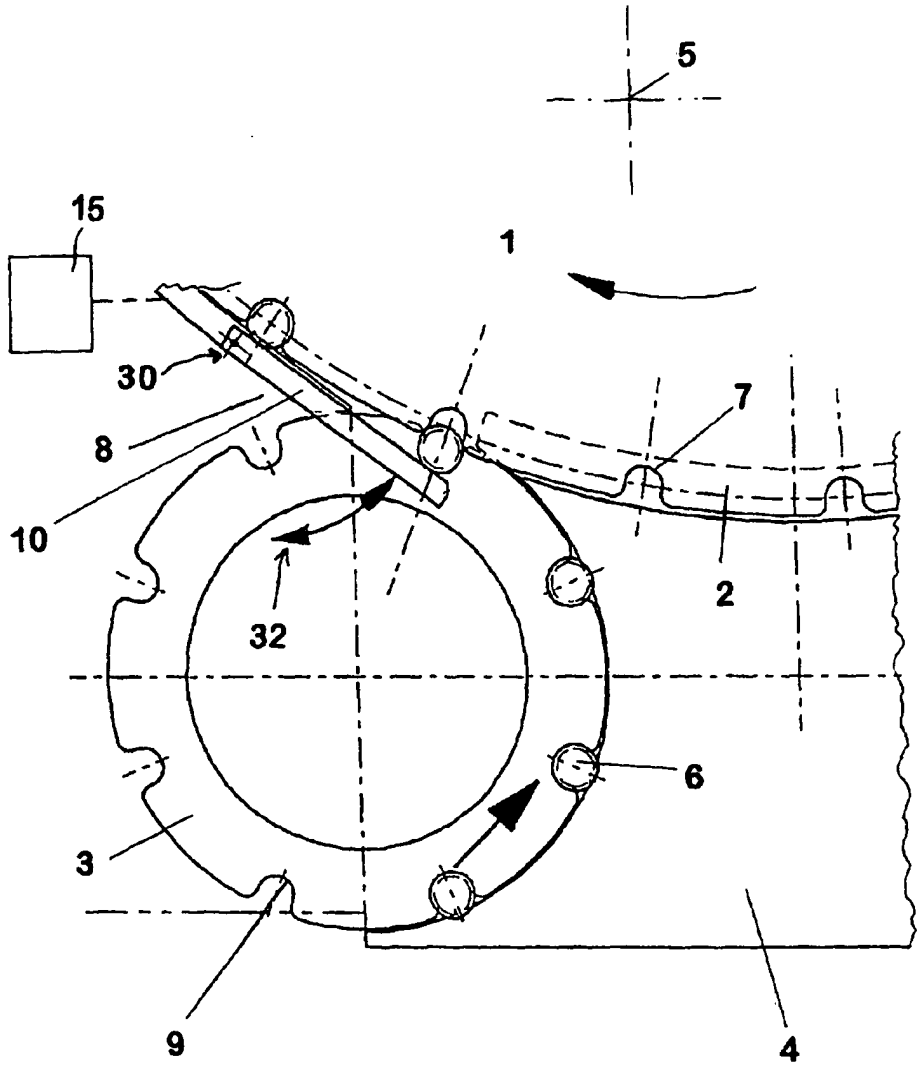


FIG. 5

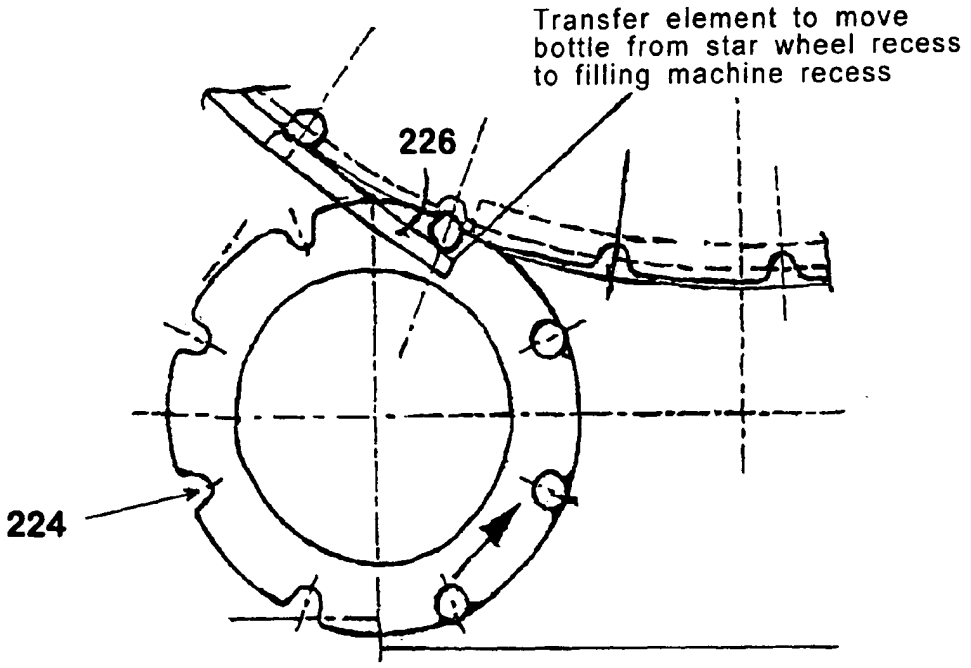

Transfer element to move bottle from star wheel recess to filling machine recess
226
224

FIG. 6

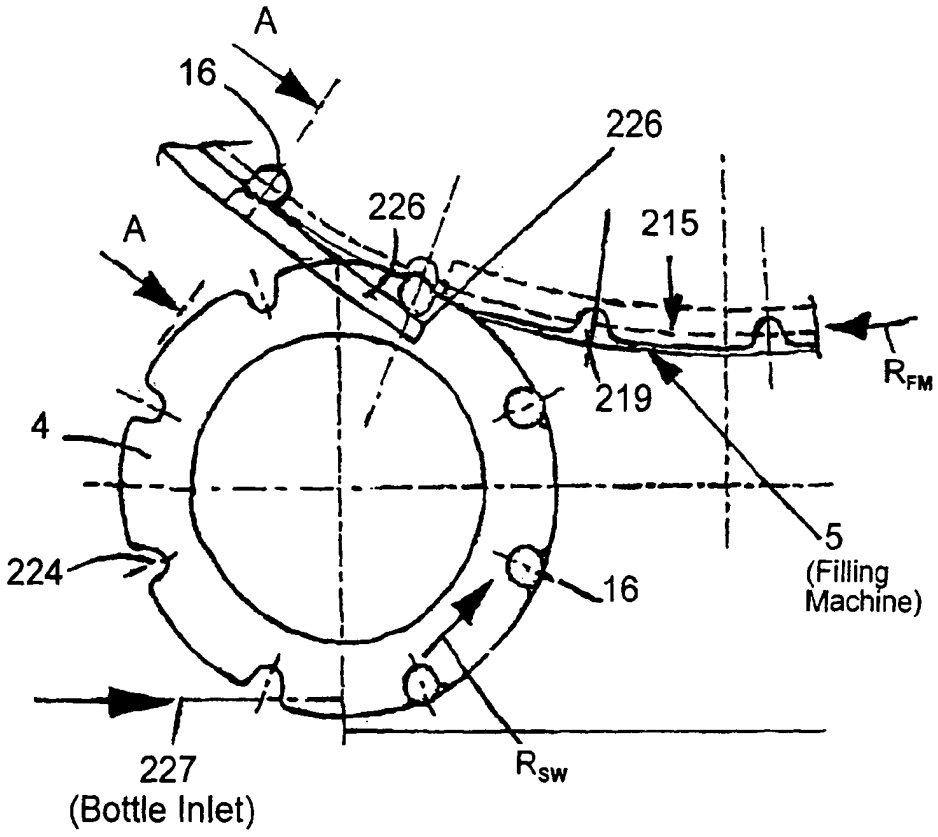

A
16
226
226
215
A
R_{FM}
219
4
5
(Filling
Machine)
224
16
227
(Bottle Inlet)
R_{SW}

FIG. 6A

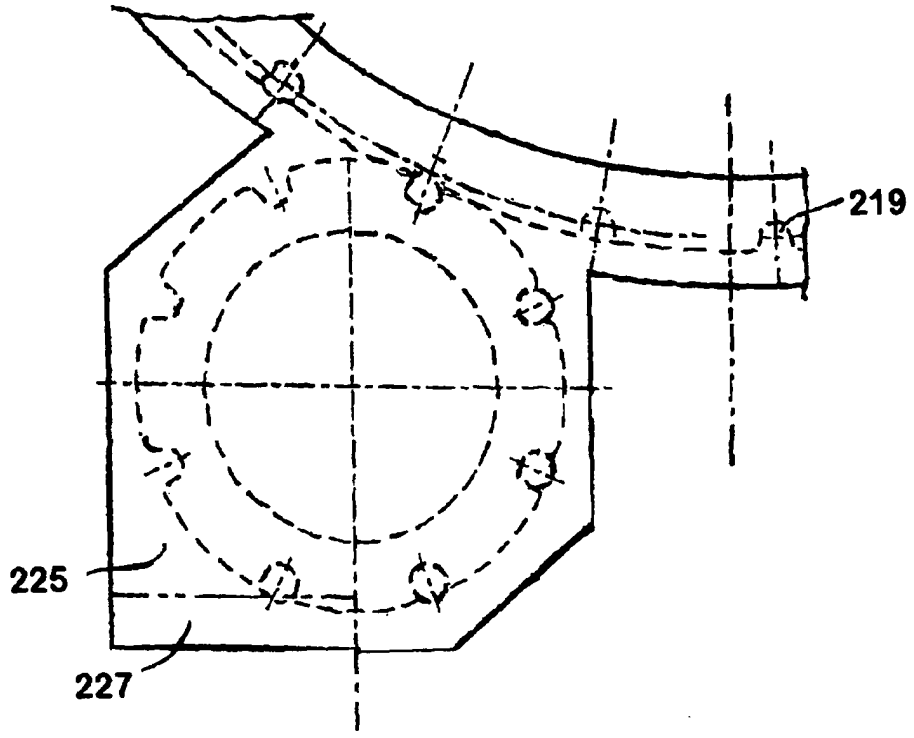


FIG. 7

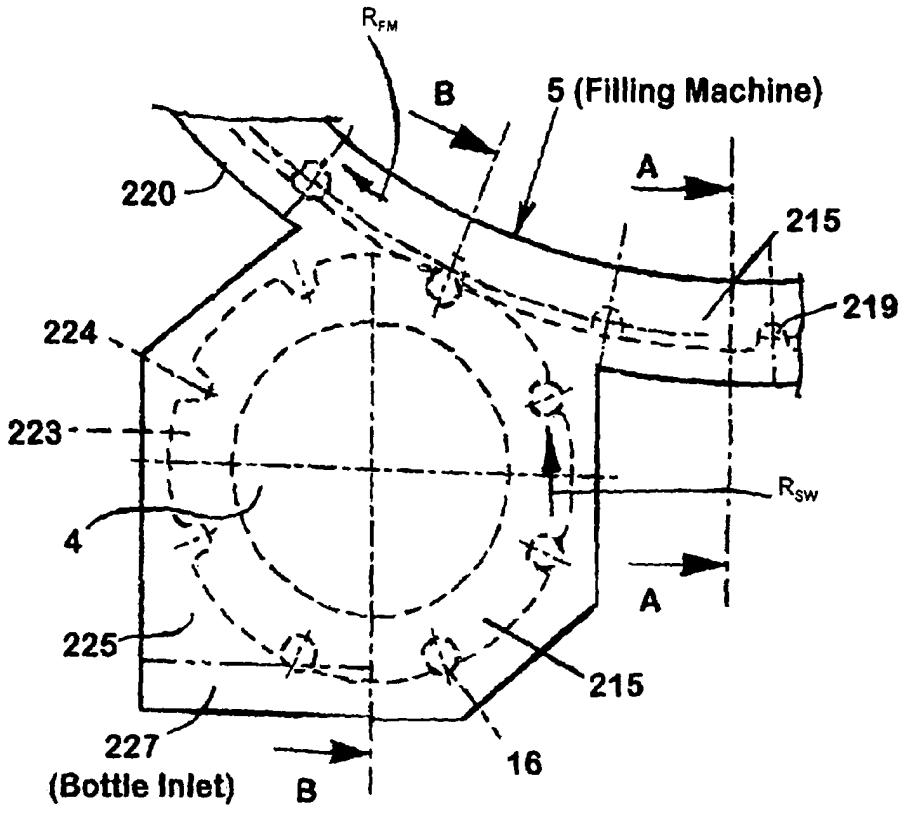

R_{FM}
B
5 (Filling Machine)
A
220
215
219
224
223
R_{SW}
4
A
225
215
227
(Bottle Inlet)
B
16

FIG. 7A

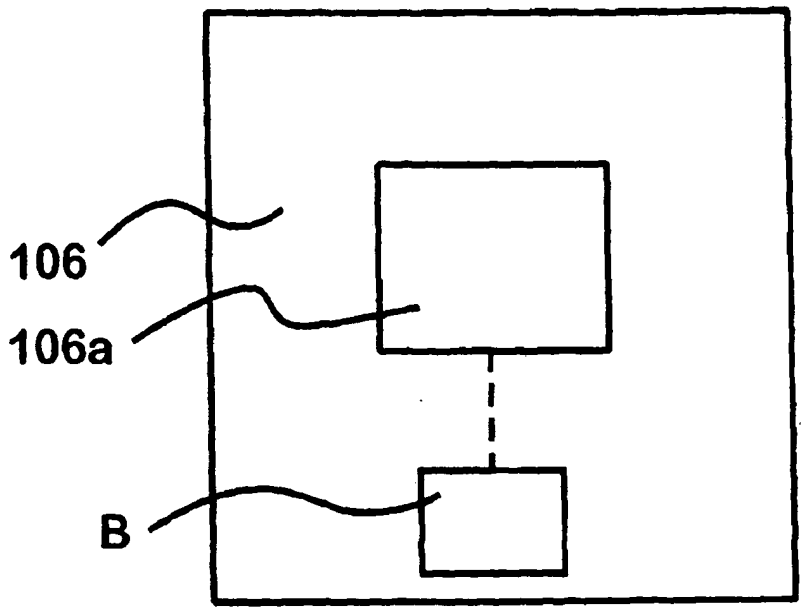


FIG. 8

BEVERAGE BOTTLING PLANT FOR FILLING BOTTLES WITH A LIQUID BEVERAGE FILLING MATERIAL, HAVING A TRANSFER DEVICE FOR THE TRANSFER OF CONTAINERS FROM A TRANSFER STARWHEEL TO THE CAROUSEL OF A CONTAINER HANDLING MACHINE

BACKGROUND

1. Technical Field

This application relates to a transfer device for container handling machines such as fillers, rinsers or cappers for the handling of containers with a neck ring, with a circulating carousel on which there are handling spaces for the container, with at least one infeed starwheel.

2. Background Information

A beverage bottling plant for filling bottles with a liquid beverage filling material can possibly comprise a beverage filling machine with a plurality of beverage filling positions, each beverage filling position having a beverage filling device for filling bottles with liquid beverage filling material. The filling devices may have an apparatus designed to introduce a predetermined volume of liquid beverage filling material into the interior of bottles to a substantially predetermined level of liquid beverage filling material. The apparatus designed to introduce a predetermined flow of liquid beverage filling material further comprises an apparatus that is designed to terminate the filling of the beverage bottles upon the liquid beverage filling material reaching the predetermined level in bottles. There may also be provided a conveyer arrangement that is designed to move bottles, for example, from an inspecting machine to the filling machine. Upon filling, a closing station closes the filled bottles. There may further be provided a conveyer arrangement configured to transfer filled bottles from the filling machine to the closing station. Bottles may be labeled in a labeling station, the labeling station having a conveyer arrangement to receive bottles and to output bottles. The closing station and the labeling station may be connected by a corresponding conveyer arrangement.

Thus, in one aspect, container handling machines comprise, for example, filling machines, closing machines, rinsers, and the like. In the case of increased production ratings, they are configured as rotatable arrangements and the handling positions that hold the containers are disposed at the circumference of the carousel and the positions move the containers during handling.

The transfer device that is an object of this application relates primarily to container handling machines for the handling of containers made of plastics such as PET, for example, such as bottles that are provided with a neck ring, for example. In addition, however, the present application also teaches the use of the transfer device for all other appropriate types of containers.

Container handling machines may include, for example, filling machines, capping machines, rinsers etc. At higher capacities, these machines may employ a rotating construction, whereby the handling spaces that receive the containers may be located on the periphery of a carousel and may carry along the containers in circulation during the handling.

Plastic containers provided with a neck ring, when they are empty or are inside the handling machine, may then be handled and/or transported generally by what may be called neck handling.

As a rule, the containers may be delivered to the handling machines by devices of the prior art for the transfer of such containers by air. Inside the handling machines, the containers may be transported by means of transfer or transport starwheels which can be specially designed for the handling of containers provided with a neck ring.

In other words, the containers may be held by the neck and may be carried through the air, rather than sitting on a conveyor device to be delivered to the transport starwheels. Such a method of conveying the bottles may help prevent bottles from falling and breaking.

The transfer of the containers by air, in which the containers may be transported in an unorganized fashion and without any fixed spacing to the transfer or transport starwheels, which may transport the containers in an organized fashion and at fixed intervals, using infeed or spacing screw conveyors of the prior art which can separate the containers that may be all piled up after being delivered by the air transport system, space them at the appropriate intervals and then feed them to a transfer or transport starwheel.

The next step may be the transfer of the containers by a transfer starwheel to the carousel or handling machine.

The constructive configurations necessary to achieve this objective can be determined to a major extent by the manner in which the containers can be held in position as they circulate with the carousel of the handling machine.

If the containers may be held in position by grippers, for example, that grip said containers in the vicinity of their mouths or on the neck rings, the transport or infeed starwheels generally can have corresponding grippers, whereby the containers may be transferred from the infeed starwheel to the carousel essentially at the apparent point of contact of the two reference circles. The release by the infeed starwheel and the fixing in position by the carousel can be thereby chronologically and spatially coordinated with each other so that the transfer may be secure, fast and reliable.

If the containers can be held in position by grippers that grip the body of the containers, the infeed starwheels generally may not have any gripper elements, but starwheel pockets that may first guide the containers securely with assistance from external guides and then deliver the containers to the grippers.

A first disadvantage of the devices described above may be the large number of components required and the associated high manufacturing and maintenance costs.

In particular for cold-aseptic bottling, which continues to gain market share, such devices can be afflicted with an additional essential disadvantage, which may be that it takes a great deal of effort and expense to keep such devices sterile in continuous operation.

To resolve this problem and others, the applicant has filed applications in Germany, e.g. Federal Republic of Germany Application Nos. 103 40 365.5, 103 42 415.6 and 103 26 618.6, which relate primarily to cold-aseptic container handling machines and may therefore be concerned with, among other things, reducing the number of components and reducing the size of the necessary clean room. Federal Republic of Germany Application Nos. 103 40 365.5, 103 42 415.6 and 103 26 618.6 are hereby incorporated by reference as if set forth in their entirety herein.

OBJECT OR OBJECTS

An object of this invention is to create a transfer device for the transfer of containers from a transfer starwheel to the carousel of a container handling machine, in particular but not exclusively for container handling machines as described in the above referenced applications which reliably avoids the above mentioned disadvantages. This appli-

cation teaches that this transfer device comprises a simple guide element. In an additional, independent configuration of the present application, this guide element is movable.

To the best of the applicant's knowledge, no such devices are disclosed in the prior art.

The above-discussed embodiments of the present invention will be described further hereinbelow. When the word "invention" is used in this specification, the word "invention" includes "inventions", that is the plural of "invention". By stating "invention", the Applicant does not in any way admit that the present application does not include more than one patentably and non-obviously distinct invention, and maintains that this application may include more than one patentably and non-obviously distinct invention. The Applicant hereby asserts that the disclosure of this application may include more than one invention, and, in the event that there is more than one invention, that these inventions may be patentable and non-obvious one with respect to the other.

BRIEF DESCRIPTION OF THE DRAWINGS

The embodiments are explained in greater detail below with reference to the exemplary embodiments illustrated in the accompanying drawings, in which:

FIG. **1A** is a schematic illustration of a container filling plant in accordance with one possible embodiment;

FIG. **1B** shows a possible embodiment of a container handling machine with an aseptic filling system or a clean room, which aseptic filling system or clean room is represented by a box around the container handling machine;

FIG. **1C** is a detail illustration of an embodiment of the housing in the region of the filling machine;

FIG. **1** shows in a greatly simplified overview two container handling machines which are connected to each other by infeed, discharge and transport starwheels, whereby all the illustrated components are part of the prior art;

FIG. **2** is a simplified plan view of a transfer device as claimed in the present application, in the installed position;

FIG. **3** shows an additional variant embodiment with a transfer arm **10** adapted to the contour of the neck ring **13** and the mouth extension **12**;

FIG. **3A** shows another embodiment with a transfer arm adapted to the contour of only the neck ring;

FIG. **4** shows an additional, simplified variant of the transfer arm **10**;

FIG. **5** shows a simplified plan view of an alternate embodiment of a transfer device with a drive system installed, indicated by a box;

FIG. **6** illustrates a transfer arrangement for transferring bottles from the input star conveyer to the filling machine;

FIG. **6A** is a view similar to FIG. **6** drawn to a larger scale and including identification of further detail;

FIG. **7** is a top plan view of the enclosed region of an input star conveyer to feed bottles to the filling machine;

FIG. **7A** is a view similar to FIG. **4** drawn to a larger scale; and

FIG. **8** is a box diagram showing a bottle closing or capping machine with a closing or capping device for applying closures or caps to a bottle.

DESCRIPTION OF EMBODIMENT OR EMBODIMENTS

Developments, advantages and potential applications of the embodiments are described below with reference to the exemplary embodiments illustrated in the accompanying drawings. All the features described and/or illustrated are the object of the present application, individually or in any possible combination, regardless of their placement in the claims or the references to other claims. The content of the claims is also an integral part of the description and is hereby incorporated by reference.

FIG. **1A** shows schematically the main components of one embodiment example of a system for filling containers, specifically, an embodiment of a beverage bottling plant **100** for filling bottles B with liquid beverage filling material, in accordance with one embodiment, or in which system or plant could possibly be utilized at least one aspect, or several an aspects, of the embodiments disclosed herein.

FIG. **1A** shows a rinsing arrangement or rinsing station **101**, to which the containers, namely bottles B, are fed in the direction of travel as indicated by the arrow **A1**, by a first conveyer arrangement **103**, which can be a linear conveyor or a combination of a linear conveyor and a starwheel. Downstream of the rinsing arrangement or rinsing station **101**, in the direction of travel as indicated by the arrow **A1**, the rinsed bottles B are transported to a beverage filling machine **105** by a second conveyer arrangement **104** that is formed, for example, by one or more starwheels that introduce bottles B into the beverage filling machine **105**.

The beverage filling machine **105** shown is of a revolving or rotary design, with a rotor **105'**, which revolves around a central, vertical machine axis. The rotor **105'** is designed to receive and hold the bottles B for filling at a plurality of filling positions **113** located about the periphery of the rotor **105'**. At each of the filling positions **103** is located a filling arrangement **114** having at least one filling device, element, apparatus, or valve. The filling arrangements **114** are designed to introduce a predetermined volume or amount of liquid beverage into the interior of the bottles B to a predetermined or desired level.

The filling arrangements **114** receive the liquid beverage material from a toroidal or annular vessel **117**, in which a supply of liquid beverage material is stored under pressure by a gas. The toroidal vessel **117** is a component, for example, of the revolving rotor **105'**. The toroidal vessel **117** can be connected by means of a rotary coupling or a coupling that permits rotation. The toroidal vessel **117** is also connected to at least one external reservoir or supply of liquid beverage material by a conduit or supply line. In the embodiment shown in FIG. **1A**, there are two external supply reservoirs **123** and **124**, each of which is configured to store either the same liquid beverage product or different products. These reservoirs **123**, **124** are connected to the toroidal or annular vessel **117** by corresponding supply lines, conduits, or arrangements **121** and **122**. The external supply reservoirs **123**, **124** could be in the form of simple storage tanks, or in the form of liquid beverage product mixers, in at least one possible embodiment.

As well as the more typical filling machines having one toroidal vessel, it is possible that in at least one possible embodiment there could be a second toroidal or annular vessel which contains a second product. In this case, each filling arrangement **114** could be connected by separate connections to each of the two toroidal vessels and have two individually-controllable fluid or control valves, so that in each bottle B, the first product or the second product can be filled by means of an appropriate control of the filling product or fluid valves.

Downstream of the beverage filling machine **105**, in the direction of travel of the bottles B, there can be a beverage bottle closing arrangement or closing station **106** which has a plurality of closing devices **106a** to close or cap the bottles B (see FIG. **8**). The beverage bottle closing arrangement or

closing station **106** can be connected by a third conveyer arrangement **107** to a beverage bottle labeling arrangement or labeling station **108**. The third conveyor arrangement may be formed, for example, by a plurality of starwheels, or may also include a linear conveyor device.

In the illustrated embodiment, the beverage bottle labeling arrangement or labeling station **108** has at least one labeling unit, device, or module, for applying labels to bottles B. In the embodiment shown, the labeling arrangement **108** is connected by a starwheel conveyer structure to three output conveyer arrangements: a first output conveyer arrangement **109**, a second output conveyer arrangement **110**, and a third output conveyer arrangement **111**, all of which convey filled, closed, and labeled bottles B to different locations.

The first output conveyer arrangement **109**, in the embodiment shown, is designed to convey bottles B that are filled with a first type of liquid beverage supplied by, for example, the supply reservoir **123**. The second output conveyer arrangement **110**, in the embodiment shown, is designed to convey bottles B that are filled with a second type of liquid beverage supplied by, for example, the supply reservoir **124**. The third output conveyer arrangement **111**, in the embodiment shown, is designed to convey incorrectly labeled bottles B. To further explain, the labeling arrangement **108** can comprise at least one beverage bottle inspection or monitoring device that inspects or monitors the location of labels on the bottles B to determine if the labels have been correctly placed or aligned on the bottles B. The third output conveyer arrangement **111** removes any bottles B which have been incorrectly labeled as determined by the inspecting device.

The beverage bottling plant can be controlled by a central control arrangement **112**, which could be, for example, computerized control system that monitors and controls the operation of the various stations and mechanisms of the beverage bottling plant.

It will be understood that while a two-product assembly or system of a bottling plant is illustrated in FIG. **1**A, the disclosure is equally applicable to single-product installations, or other commensurate embodiments.

FIG. **1**B shows a possible embodiment of a container handling machine with an aseptic filling system or a clean room, which aseptic filling system or clean room is represented by a box around the container handling machine.

FIG. **1**C shows an example of an aseptic bottling system, which may possibly be utilized or adapted for use in one possible embodiment. In accordance with the embodiment that is illustrated in FIG. **1**C, the clean chamber comprises a chamber, or a space, or a room **415** that surrounds only a portion of the beverage containers **16**, namely, at least the mouth portions **417** thereof. Holders, supports and centering arrangements or centering devices **419** for the bottle mouths **417** are possibly directly disposed at the lower horizontal wall surface **418** that is rotating with the machine carousel. FIG. **1**C illustrates in particular detail a seal arrangement **440** between surface **5***a* of a portion of filling machine **5** and surface **421***a* of stationary wall portion **421***b*. There may be provided similar seal arrangements **442** and **444** between the projecting portion of centering wall **422** and the groove **421***c* of the stationary wall **421**. The centering wall **422** may comprise a slot, or slots, or similar openings **446** that may be covered by a cover, or covers, **448**. Such covers **448** may possibly be actuated by cam arrangements configured and disposed to move the covers **448** to cover and uncover the slots or openings **446**. Seals may be superfluous in at least one embodiment in which the disinfecting medium is introduced into chamber **415** with sufficient pressure to prevent ingress of microorganisms. The chamber **415** is generally configured by rotatable portions or components **418** and by stationary portions or components **421**.

The conduit **413** is introduced, in one embodiment, through a vertical wall **418***a* that is part of the filling machine **5**. FIG. **1**C also indicates a filling valve **430**, as is known in the art.

FIG. **1** shows in a greatly simplified overview two container handling machines which are connected to each other by infeed, discharge and transport starwheels, whereby all the illustrated components are part of the prior art.

FIG. **2** shows a segment of the circle of the carousel **2** of a container handling machine **1**, whereby the machine in question can, for example, be a rinser or even a capper. The illustrated exemplary embodiment is a rotating type filling machine. The circulating portion of the filling machine, the carousel **2**, can be rotated around the axis of rotation **5** of the machine.

By means of the infeed starwheel **3**, which is equipped with starwheel pockets **9**, the containers **6** are fed to the container handling machine **1**, whereby an external guide **4** assists the guidance of the containers **6** at least for a determined distance.

To hold the containers **6** in the container handling machine **1**, on the carousel **2** there are receiving pockets **7** into which the containers **6** are inserted by means of the transfer device **8**.

For the insertion of the containers **6**, the containers are first pushed toward the transfer device **8** by the continuously rotating infeed starwheel **3**. Because the transfer device **8** is stationary and immobile, as the carousel **2** and infeed starwheel **3** advance, the containers **6** are pushed out of the starwheel pockets **9** and into the corresponding receiving pockets **7** of the carousel **2**.

In other words, as the infeed starwheel **3** rotates and advances the bottles toward the carousel **2**, the infeed starwheel eventually comes into contact with the transfer device **8**. The transfer device **8** is disposed at such an angle with respect to the infeed starwheel **3** that it allows the bottle to slide along the length of the external guide **4**, eventually forcing the bottle into the receiving pockets **7** of the carousel **2**.

The transfer device **8** consists essentially of the transfer arm **10** which is fastened in a stationary position on the container handling machine or on its components or other components by means of a fastening device (not shown), i.e. so that it does not rotate with the carousel **2**.

In one possible embodiment, the transfer arm **10** may be mounted in a stationary position on the starwheels **3** or carousels **2** of the container handling machine. In an alternate embodiment, the transfer arm **10** may be mounted on its own mounting device, separate from the starwheels **3**, the carousels **2**, or any other components of the container handling machine.

The transfer arm **10** is a single element that is constructed with a rigid material such as metal or plastic. The transfer arm **10** is rigid, that is, not able to bend or otherwise change shape so that it stays in a uniform, stationary position. Further, the transfer arm **10** comprises at least one part that is not moveable with respect to the other parts of the bottling machine.

There are essentially three possible configurations of the transfer arm **10**. First this arm can be adapted in its geometric dimensions exclusively to the shape of the mouth extension **12** of the bottle that lies between the neck **13** and the threaded portion of the container, which results in

particularly simple opportunities for the manufacture of the transfer arm **10**. In this case, for example, the transfer arm **10** can be manufactured easily and economically from sheet metal, plastic or another suitable material. A configuration of this type is illustrated in FIG. **4** by way of example.

The transfer arm **10** can also be adapted exclusively to the contour or to the diameter of the neck ring **13**.

As an improvement to the variant configurations described above, and as illustrated in FIG. **3**, it is also possible to adapt the transfer arm **10** completely to the contour formed jointly by the neck ring **13** and the mouth extension **12** of the bottle. In this process, an improved guidance and transfer of the container between the infeed starwheel and carousel **2** or the receiving pockets **7** is achieved. In this variant it is appropriate to fabricate the transfer arm **10** not from a sheet metal material but from a suitable solid material made of metal or another material.

Because the contour formed by the neck ring **13** and/or the mouth extension **12** of the bottle, but also the contour or the diameter of the mouth extension **12** of the bottle can differ from one type of container to another, it is particularly advantageous at least to make it easy to replace or exchange the transfer arm **10**.

It is also advantageous to provide a friction-reducing and/or wear-reducing coating on the surfaces and/or edges of the transfer arm **10** that come into contact with the moving containers **6**. Appropriate coatings for this purpose include, for example, a hard chromium plating or a coating with tungsten carbide.

In an alternate embodiment, the transfer arm **10** could be covered with a removable sheath to prevent wear and also to keep the transfer arm **10** clean and free of dust. Such a sheath would also make cleaning the transfer arm **10** relatively easy.

In a variation of the essentially semi-circular realization of the starwheel pockets **9** and receiving pockets **7** illustrated in FIG. **2**, to improve the movement and to simplify the transition of the containers **6**, another, more advantageous contour of the pockets can be provided, without thereby going beyond the context of this application.

After the transfer of the containers **6** into the carousel **2**, the stationary external guide **4** that also at least partly surrounds the carousel **2** assists in the guidance of the containers **6**, whereby the external guide **4** can simultaneously form a portion of the lower enclosure of the clean room.

To adapt the transfer device **8** described here to different container neck or container ring neck diameters, the present application teaches that the transfer device **8** and/or the transfer arm **10** can be made adjustable.

In an additional and extremely advantageous realization of this application, the transfer device **8** and/or the transfer arm **10** also assists, accelerates and therefore optimizes the transfer process by active movements, as a result of which higher throughputs can be achieved.

For the realization of this function at least the transfer arm **10** can pivot, as a result of which the transfer arm transfers each container by an active movement from the starwheel pockets **9** into the receiving pockets **7**.

FIG. **5** shows an alternate embodiment with a drive system **15**, such as a hinge mechanism and a locking mechanism, installed for actively moving the transfer arm **10** in order to transfer each container from the starwheel pockets **9** into the receiving pockets **7**. The drive system **15** causes the transfer arm **10** to pivot at a hinge or pivot structure **30** back and forth in the direction shown by double arrow **32** to actively push each container out of the starwheel pockets **9** and into the receiving pockets **7** as the starwheel rotates in the direction **33**. The drive system **15** is configured to effect a controlled movement of the transfer arm **10** as would be desired.

All the drive systems disclosed by the prior art that are appropriate for this application can be used as the drive for this pivoting movement. Several appropriate types of drives are listed below by way of examples, and with no intention of limiting the scope of the present application: pneumatic cylinders, hydraulic cylinders, rotation and/or pivoting drive systems with an electrical, hydraulic or pneumatic drive, (electro-)magnets that act by attraction or repulsion, control cams located on the infeed starwheel, tensile and/or compression springs, including such springs used in connection with control cams.

No further description of the design or construction of a drive system for the pivoting movement is provided here, because the practical realization of a drive system of this type is not the object of this application.

In an additional realization of this application, the position and/or the size of the pivoting movement of the transfer arm **10** can be adjustable, so that the transfer device **8** can be adapted to different container dimensions. No further description of the design or construction measures required is given here, because the practical realization of such a device is likewise not the object of this application.

Another possible embodiment may be used in an aseptic bottling system or clean room. FIGS. **6**, **6A**, **7**, and **7A** show an embodiment used with an aseptic bottling system.

In accordance with FIGS. **6** and **6A**, and according to at least one possible embodiment, the container mouths may be introduced at a narrow entrance opening and exit opening **227** of the star pockets, or, respectively, the centering devices **224**, or, respectively, removed from these upon completion of processing. For introduction of the sterile medium, inlets or nozzles can be provided at various locations, so as to maintain a rather constant and a rather all-pervasive low over-pressure in a clean chamber **215**. However, it is within the scope of the various embodiments to carry out the introduction of the sterile medium at the container input side, whereby this sterile medium, or, respectively, a portion thereof, flows through the clean chamber **215** in the direction of rotation of the equipment while utilizing the rotational flow, compare arrow R_{FM} and arrow R_{SW}, in FIGS. **7A** and **6A**.

In accordance with another possible embodiment, and in accordance with the embodiment of FIGS. **6**, **6A**, **7**, and **7A**, the starwheels are provided by a flat disc **223** with corresponding recesses, supports, and/or centering structures **224** to hold bottles **16**. These discs are enveloped by a stationary upper hood component **225** whereby the rotating disc surface provides the lower limit of the chamber. For introduction and removal of the mouth in the transfer region of the filling machine **205**, and the like equipment, there can be provided transfer devices **226**, and the like transfer elements, or arrangements to move the bottle from the starwheel recess **224** to the filling machine recess **219**, as is illustrated by way of an input embodiment in FIG. **7** and FIG. **7A**.

One feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a beverage bottling plant for filling bottles with a liquid beverage filling material, said beverage bottling plant comprising: a rotatable bottle cleaning station; a beverage filling machine; a bottle closing station; a bottle labeling station; said rotatable bottle cleaning station being configured to clean bottles comprising: a bottle cleaning station carousel configured to transport bottles; said beverage bottle

cleaning station carousel having an axis disposed vertically about which vertical axis said bottle cleaning station carousel is rotatable; said bottle cleaning station carousel comprising receiving pockets for holding the necks of bottles; a bottle cleaning station transfer starwheel being configured to transport bottles into said rotatable cleaning station; said transfer starwheel having an axis disposed vertically about which vertical axis said bottle cleaning station transfer starwheel is rotatable; a bottle cleaning station transfer device comprising: a bottle cleaning station transfer arm that is rigid, non-articulatable, and non-bendable and that is disposed substantially between said bottle cleaning station transfer starwheel and said bottle cleaning station carousel; said bottle cleaning station transfer arm being configured and disposed to guide bottles from said bottle cleaning station transfer starwheel to said bottle cleaning station carousel; and said bottle cleaning station transfer arm being configured and disposed to make contact with the necks of bottles from said bottle cleaning station transfer starwheel upon the rotation of said bottle cleaning station transfer starwheel, and to guide the necks of bottles to slide the necks of the bottles along said transfer device and then guide the necks of bottles into the receiving pockets of said bottle cleaning station carousel; said beverage bottling plant for filling bottles with a liquid beverage filling material further comprising: a storage apparatus being configured and disposed to store a liquid beverage filling material; a rotatable beverage filling machine being configured and disposed to fill empty bottles with liquid beverage filling material; a conduit arrangement being configured and disposed to supply liquid beverage filling material from said storage apparatus to said beverage filling machine; said rotatable beverage filling machine also comprising a plurality of beverage filling stations, each beverage filling station comprising a beverage filling device for filling bottles with liquid beverage filling material; said filling devices comprising an apparatus being configured to introduce a predetermined volume of liquid beverage filling material into interiors of bottles to a substantially predetermined level of liquid beverage filling material and to terminate the filling of beverage bottles upon liquid beverage filling material reaching said substantially predetermined level in bottles; a beverage filling machine carousel configured to transport bottles; said beverage filling machine carousel having an axis disposed vertically about which vertical axis said beverage filling machine carousel is rotatable; said beverage filling machine carousel comprising receiving pockets for holding the necks of bottles; a beverage filling machine transfer starwheel configured to transport bottles into said beverage filling machine; said beverage filling machine transfer starwheel having an axis disposed vertically about which vertical axis said beverage filling machine transfer starwheel is rotatable; a beverage filling machine transfer device comprising: a beverage filling machine transfer arm that is rigid, non-articulatable, and non-bendable and that is disposed substantially between said beverage filling machine transfer starwheel and said beverage filling machine carousel; said beverage filling machine transfer arm being configured and disposed to guide bottles from said beverage filling machine transfer starwheel to said beverage filling machine carousel; and said beverage filling machine transfer arm being configured and disposed to make contact with the necks of bottles from said beverage filling machine transfer starwheel upon the rotation of said bottle filling machine transfer starwheel, and to guide the necks of bottles to slide the necks of the bottles along said transfer device and then guide the necks of bottles into the receiving pockets of said beverage filling machine bottle filling machine carousel; said beverage bottling plant for filling bottles with a liquid beverage filling material further comprising: a bottle closing station being configured and disposed to secure bottle caps to bottles to be closed and comprising: a bottle closing station carousel configured to transport bottles; said bottle closing station carousel having an axis disposed vertically about which vertical axis said bottle closing station carousel is rotatable; said closing station carousel comprising receiving pockets for holding the necks of bottles; a bottle closing station transfer starwheel configured to transport bottles into said closing station; said bottle closing station transfer starwheel having an axis disposed vertically about which vertical axis said bottle closing station transfer starwheel is rotatable; a transfer device comprising: a bottle closing station transfer arm that is rigid, non-articulatable, and non-bendable and that is disposed substantially between said bottle closing station transfer starwheel and said bottle closing station carousel; said bottle closing station transfer arm being configured and disposed to guide bottles from said bottle closing station transfer starwheel to said bottle closing station carousel; and said bottle closing station transfer arm being configured and disposed to make contact with the necks of bottles from said bottle closing station transfer starwheel upon the rotation of said bottle closing station transfer starwheel, and to guide the necks of bottles to slide the necks of the bottles along said transfer device and then guide the necks of bottles into the receiving pockets of said bottle closing station carousel; said beverage bottling plant for filling bottles with a liquid beverage filling material further comprising a bottle labeling station being configured and disposed to label closed, filled bottles comprising: a frame structure having an axis disposed vertically; a turntable structure being configured and disposed to rotate about said vertical axis of said frame structure, said turntable structure having a peripheral region; a drive arrangement being configured and disposed to rotate said turntable structure about said vertical axis of said frame structure; a plurality of support tables being configured to support and to rotate a bottle; said support tables being disposed at said peripheral region of said turntable structure; each support table having an axis disposed vertically about which vertical axis a support table is rotatable; each support table comprising a drive arrangement being configured and disposed to rotate its corresponding support table about its vertical support table axis, to permit rotation of a bottle supported on a support table; a labeling station transfer starwheel configured to transport bottles into said labeling station; said labeling station transfer starwheel having an axis disposed vertically about which vertical axis said labeling station transfer starwheel is rotatable; a labeling station transfer device comprising: a labeling station transfer arm that is rigid, non-articulatable, and non-bendable and that is disposed substantially between said labeling station transfer starwheel and said turntable structure; said labeling station transfer arm being configured and disposed to guide bottles from said labeling station transfer starwheel to said turntable structure; and said labeling station transfer arm being configured and disposed to make contact with the necks of bottles from said labeling station transfer starwheel upon the rotation of said labeling station transfer starwheel, and to guide the necks of bottles to slide the necks of the bottles along said transfer arm and then guide the necks of bottles into the receiving pockets of said at least one turntable structure.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer

device comprises an arrangement for permitting movement or controlled pivoting of said transfer arm.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer arm has a contour, which contour can be adjusted for different diameters of mouth portions of bottles or different diameters of neck rings of bottles.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer device comprises an arrangement for adjusting the magnitude and/or position of the pivoting movement of said transfer arm.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer device comprises a first contour, which first contour is shaped to complimentarily engage and guide the contour of mouth portions of bottles.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer device comprises a second contour, which second contour is shaped to complimentarily engage and guide the contour of mouth portions of bottles and neck rings of bottles.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer device comprises a second contour, which second contour is shaped to complimentarily engage and guide the contour of neck rings of bottles.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer arm comprises an arrangement for reducing friction.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer arm comprises an arrangement for reducing wear of said transfer arm.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a method of aseptically filling plastic bottles with neck guide rings with a liquid beverage filling material in a beverage bottling plant, which beverage bottling plant comprises at least one of: a bottle cleaning machine station; a beverage filling machine station; a bottle closing station; a bottle labeling station; at least one of said stations comprising a transfer device; said transfer device comprising a transfer arm being rigid and non-articulatable and being configured to minimize contamination of containers and beverage filling material being bottled by said beverage bottling plant; said transfer arm being configured and disposed to make contact with necks of bottles and to guide necks of bottles along said transfer device and into the corresponding station of said transfer device; said method comprising the steps of: guiding the top portions of bottles aseptically with said transfer arm by making contact with the top portions of bottles; and guiding the top portions of bottles aseptically along said transfer arm and into the corresponding station of said transfer arm.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein: said transfer device comprises an arrangement for permitting movement or controlled pivoting of said transfer arm; said transfer arm has a contour, which contour can be adjusted for different diameters of mouth portions of bottles or different diameters of neck rings of bottles; said transfer device comprises an arrangement for adjusting the magnitude and/or position of the pivoting movement of said transfer arm; said transfer device comprises a first contour, which first contour is shaped to complimentarily engage and guide the contour of mouth portions of bottles; said transfer device comprises a second contour, which second contour is shaped to complimentarily engage and guide the contour of mouth portions of bottles and neck rings of bottles; said transfer device comprises a second contour, which second contour is shaped to complimentarily engage and guide the contour of neck rings of bottles; said transfer arm comprises an arrangement for reducing friction; and said transfer arm comprises an arrangement for reducing wear of said transfer arm.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in: In a beverage container filling plant for filling containers with a liquid beverage filling material, said beverage container filling plant comprising at least one of: a bottle cleaning station; a beverage filling machine station; a bottle closing station; a bottle labeling station; a transfer device in at least one of said stations: said transfer device comprising a transfer arm being rigid and non-articulatable; said transfer arm being configured and disposed to guide containers to its corresponding station; and said transfer arm being configured and disposed to make contact with the top portions of containers and to guide the top portions of containers along said transfer arm and into the corresponding station of said transfer arm.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer device comprises an arrangement for permitting movement or controlled pivoting of said transfer arm.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer arm has a contour, which contour can be adjusted for different diameters of mouth portions of bottles or different diameters of neck rings of bottles.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer device comprises an arrangement for adjusting the magnitude and/or position of the pivoting movement of said transfer arm.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer device comprises a first contour, which first contour is shaped to complimentarily engage and guide the contour of mouth portions of bottles.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer device comprises a second contour, which second contour is shaped to complimentarily engage and guide the contour of mouth portions of bottles and neck rings of bottles.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer device comprises a second contour, which second contour is shaped to complimentarily engage and guide the contour of neck rings of bottles.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer arm comprises an arrangement for reducing friction.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device, wherein said transfer arm comprises an arrangement for reducing wear of said transfer arm.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device for container handling machines such as fillers, rinsers or cappers for the handling of containers with a neck ring, with a circulating carousel on which there are handling spaces for the container, with at least one infeed starwheel, characterized by the fact that the transfer device consists of a rigid transfer arm.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device characterized by the fact that on the transfer device there are means that make possible and/or perform a controlled pivoting movement of the transfer arm.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device characterized by the fact that the transfer arm can be adjusted for different diameters of the mouth extension of the bottle or different diameters of the neck ring.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device characterized by the fact that on the transfer device there are means that make it possible to adjust the size and/or position of the pivoting movement of the transfer arm.

Another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device characterized by the fact that the transfer arm is adapted to the contour of the mouth extension of the bottle.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device characterized by the fact that the transfer arm is adjusted to the contour formed by the mouth extension of the bottle and neck ring.

Yet another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device characterized by the fact that the transfer arm is adjusted to the contour of the neck ring.

Still another feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device characterized by the fact that the transfer arm is coated at least partly with friction-reducing means.

A further feature or aspect of an embodiment is believed at the time of the filing of this patent application to possibly reside broadly in a transfer device characterized by the fact that the transfer arm is coated at least partly with wear-reducing means.

Some examples of low friction coatings which may possibly be utilized or adapted for use in at least one possible embodiment may possibly be found in the following U.S. Pat. No. 6,551,718, entitled "Low friction coating;" U.S. Pat. No. 6,284,322, entitled "Low-friction coating composition;" U.S. Pat. No. 6,084,034, entitled "Functional coating for reducing friction;" U.S. Pat. No. 5,763,011, "Functional coating for reducing friction;" U.S. Pat. No. 5,674,951, entitled "Abrasion-resistant and low friction coating compositions;" U.S. Pat. No. 5,482,637, entitled "Anti-friction coating composition containing solid lubricants;" and U.S. Pat. No. 4,849,264, entitled "Friction reducing coating for metal surfaces." Another example of a low friction coating that could possibly be used in at least one possible embodiment is Teflon.

Some examples of bottling systems that may possibly be utilized or possibly adapted for use in at least one possible embodiment of the present application may possibly be found in the following U.S. patents, all assigned to the Assignee herein, namely: U.S. Pat. Nos. 4,911,285; 4,944,830; 4,950,350; 4,976,803; 4,981,547; 5,004,518; 5,017,261; 5,062,917; 5,062,918; 5,075,123; 5,078,826; 5,087,317; 5,110,402; 5,129,984; 5,167,755; 5,174,851; 5,185,053; 5,217,538; 5,227,005; 5,413,153; 5,558,138; 5,634,500; 5,713,403; 6,276,113; 6,213,169; 6,189,578; 6,192,946; 6,374,575; 6,365,054; 6,619,016; 6,474,368; 6,494,238; 6,470,922; and 6,463,964.

The components disclosed in the various publications, disclosed or incorporated by reference herein, may possibly be used in possible embodiments, as well as equivalents thereof.

The purpose of the statements about the technical field is generally to enable the Patent and Trademark Office and the public to determine quickly, from a cursory inspection, the nature of this patent application. The description of the technical field is believed, at the time of the filing of this patent application, to adequately describe the technical field of this patent application. However, the description of the technical field may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the technical field are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

Some examples of stepping motors that may possibly be utilized or possibly adapted for use in at least one possible embodiment of the present application may possibly be found in the following U.S. Pat. No. 6,348,774 issued to Andersen et al. on Feb. 19, 2002; U.S. Pat. No. 6,373,209 issued to Gerber et al. on Apr. 16, 2002; U.S. Pat. No. 6,424,061 issued to Fukuda et al. on Jul. 23, 2002; U.S. Pat. No. 6,509,663 issued to Aoun on Jan. 21, 2003; U.S. Pat. No. 6,548,923 to Ohnishi et al. on Apr. 15, 2003; and U.S. Pat. No. 6,661,193 issued to Tsai on Dec. 9, 2003.

The appended drawings in their entirety, including all dimensions, proportions and/or shapes in at least one embodiment of the present application, are accurate and are hereby included by reference into this specification.

The background information is believed, at the time of the filing of this patent application, to adequately provide background information for this patent application. However, the background information may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the background information are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

All, or substantially all, of the components and methods of the various embodiments may be used with at least one

embodiment or all of the embodiments, if more than one embodiment is described herein.

Some examples of sensors that may possibly be utilized or possibly adapted for use in at least one possible embodiment of the present application may possibly be found in the following U.S. Pat. No. 6,062,248 issued to Boelkins on May 16, 2000; U.S. Pat. No. 6,223,593 issued to Kubisiak et al. on May 1, 2001; U.S. Pat. No. 6,466,035 issued to Nyfors et al. on Oct. 15, 2002; U.S. Pat. No. 6,584,851 issued to Yamagishi et al. on Jul. 1, 2003; U.S. Pat. No. 6,631,638 issued to James et al. on Oct. 14, 2003; and U.S. Pat. No. 6,707,307 issued to McFarlane et al. on Mar. 16, 2004.

The purpose of the statements about the object or objects is generally to enable the Patent and Trademark Office and the public to determine quickly, from a cursory inspection, the nature of this patent application. The description of the object or objects is believed, at the time of the filing of this patent application, to adequately describe the object or objects of this patent application. However, the description of the object or objects may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the object or objects are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

All of the patents, patent applications and publications recited herein, and in the Declaration attached hereto, are hereby incorporated by reference as if set forth in their entirety herein.

The summary is believed, at the time of the filing of this patent application, to adequately summarize this patent application. However, portions or all of the information contained in the summary may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the summary are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

Some examples of servo-motors that may possibly be utilized or possibly adapted for use in at least one possible embodiment of the present application may possibly be found in the following U.S. Pat. No. 4,050,434 issued to Zbikowski et al. on Sep. 27, 1977; U.S. Pat. No. 4,365,538 issued to Andoh on Dec. 28, 1982; U.S. Pat. No. 4,550,626 issued to Brouter on Nov. 5, 1985; U.S. Pat. No. 4,760,699 issued to Jacobsen et al. on Aug. 2, 1988; U.S. Pat. No. 5,076,568 issued to de Jong et al. on Dec. 31, 1991; and U.S. Pat. No. 6,025,684 issued to Yasui on Feb. 15, 2000.

It will be understood that the examples of patents, published patent applications, and other documents which are included in this application and which are referred to in paragraphs which state "Some examples of . . . which may possibly be used in at least one possible embodiment of the present application . . . " may possibly not be used or useable in any one or more embodiments of the application.

The sentence immediately above relates to patents, published patent applications and other documents either incorporated by reference or not incorporated by reference.

The corresponding foreign patent publication applications, namely, Federal Republic of Germany Patent Application No. 103 45 317.2, filed on Sep. 30, 2003, having inventor Volker Till, and DE-OS 103 45 317.2 and DE-PS 103 45 317.2, as well as their published equivalents, and other equivalents or corresponding applications, if any, in corresponding cases in the Federal Republic of Germany and elsewhere, and the references and documents cited in any of the documents cited herein, such as the patents, patent applications and publications, are hereby incorporated by reference as if set forth in their entirety herein.

Some examples of labeling machines which may possibly be utilized in at least one possible embodiment may possibly be found in the following U.S. Pat. No. 6,634,400, entitled "Labeling machine;" U.S. Pat. No. 6,561,246, entitled "Labeling machine capable of precise attachment of a label to different sizes of containers;" U.S. Pat. No. 6,550,512, entitled "Labeling machine capable of preventing erroneous attachment of labels on containers;" U.S. Pat. No. 6,543,514, entitled "In-line continuous feed sleeve labeling machine and method;" U.S. Pat. No. 6,378,587, entitled "Cylindrical container labeling machine;" U.S. Pat. No. 6,328,086, entitled "Labeling machine;" U.S. Pat. No. 6,315,021, entitled "Labeling machine;" U.S. Pat. No. 6,263,940, entitled "In-line continuous feed sleeve labeling machine and method;" U.S. Pat. No. 6,199,614, entitled "High speed labeling machine having a constant tension driving system;" U.S. Pat. No. 6,167,935, entitled "Labeling machine; U.S. Pat. No. 6,066,223, entitled "Labeling machine and method; U.S. Pat. No. 6,050,319, entitled "Non-round container labeling machine and method;" and U.S. Pat. No. 6,045,616, entitled "Adhesive station and labeling machine."

All of the references and documents, cited in any of the documents cited herein, are hereby incorporated by reference as if set forth in their entirety herein. All of the documents cited herein, referred to in the immediately preceding sentence, include all of the patents, patent applications and publications cited anywhere in the present application.

The description of the embodiment or embodiments is believed, at the time of the filing of this patent application, to adequately describe the embodiment or embodiments of this patent application. However, portions of the description of the embodiment or embodiments may not be completely applicable to the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, any statements made relating to the embodiment or embodiments are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

Some examples of bottling systems which may possibly be utilized or adapted for use in at least one possible embodiment may possibly be found in the following U.S. Pat. No. 6,684,602, entitled "Compact bottling machine;" U.S. Pat. No. 6,470,922, entitled "Bottling plant for bottling carbonated beverages;" U.S. Pat. No. 6,390,150, entitled "Drive for bottling machine;" U.S. Pat. No. 6,374,575, entitled "Bottling plant and method of operating a bottling plant;" U.S. Pat. No. 6,192,946, entitled "Bottling system;" U.S. Pat. No. 6,185,910, entitled "Method and an apparatus for high-purity bottling of beverages;" U.S. Pat. No. 6,058,985, entitled "Bottling machine with a set-up table and a set-up table for a bottling machine and a set-up table for a bottle handling machine;" U.S. Pat. No. 5,996,322, entitled "In-line bottling plant;" U.S. Pat. No. 5,896,899, entitled "Method and an apparatus for sterile bottling of beverages;" U.S. Pat. No. 5,848,515, entitled "Continuous-cycle sterile bottling plant;" U.S. Pat. No. 5,634,500, entitled "Method

for bottling a liquid in bottles or similar containers;" and U.S. Pat. No. 5,425,402, entitled "Bottling system with mass filling and capping arrays."

The details in the patents, patent applications and publications may be considered to be incorporable, at applicant's option, into the claims during prosecution as further limitations in the claims to patentably distinguish any amended claims from any applied prior art.

The purpose of the title of this patent application is generally to enable the Patent and Trademark Office and the public to determine quickly, from a cursory inspection, the nature of this patent application. The title is believed, at the time of the filing of this patent application, to adequately reflect the general nature of this patent application. However, the title may not be completely applicable to the technical field, the object or objects, the summary, the description of the embodiment or embodiments, and the claims as originally filed in this patent application, as amended during prosecution of this patent application, and as ultimately allowed in any patent issuing from this patent application. Therefore, the title is not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

Some examples of starwheels which may possibly be utilized or adapted for use in at least one possible embodiment may possibly be found in the following U.S. Pat. No. 5,613,593, entitled "Container handling starwheel;" U.S. Pat. No. 5,029,695, entitled "Improved starwheel;" U.S. Pat. No. 4,124,112, entitled "Odd-shaped container indexing starwheel;" and U.S. Pat. No. 4,084,686, entitled "Starwheel control in a system for conveying containers."

The abstract of the disclosure is submitted herewith as required by 37 C.F.R. §1.72(b). As stated in 37 C.F.R. §1.72(b):

> A brief abstract of the technical disclosure in the specification must commence on a separate sheet, preferably following the claims, under the heading "Abstract of the Disclosure." The purpose of the abstract is to enable the Patent and Trademark Office and the public generally to determine quickly from a cursory inspection the nature and gist of the technical disclosure. The abstract shall not be used for interpreting the scope of the claims.

Therefore, any statements made relating to the abstract are not intended to limit the claims in any manner and should not be interpreted as limiting the claims in any manner.

The embodiments described herein above in the context of the preferred embodiments are not to be taken as limiting the embodiments to all of the provided details thereof, since modifications and variations thereof may be made without departing from the spirit and scope of the embodiments.

What is claimed is:

1. An aseptic bottle filling plant for aseptically cold filling bottles with a cold aseptic liquid beverage material, said aseptic bottle filling plant comprising:

a plurality of aseptic bottle handling machines comprising at least an aseptic bottle rinsing machine, a rotary aseptic bottle filling machine, and a rotary aseptic bottle closing machine;

a first at least one aseptic starwheel arrangement being configured and disposed to aseptically convey bottles to be rinsed to said aseptic bottle rinsing machine;

said aseptic bottle rinsing machine being configured to aseptically rinse bottles;

said aseptic bottle rinsing machine comprising:

a conveyor arrangement being configured and disposed to convey bottles through said aseptic bottle rinsing machine;

a rinsing arrangement being configured and disposed to aseptically rinse bottles being conveyed by said conveyor arrangement though said aseptic bottle rinsing machine;

an aseptic bottle rinsing machine transfer device comprising:

a pivotable aseptic bottle rinsing machine transfer arm that is disposed substantially between said first at least one starwheel arrangement and said conveyor arrangement;

said aseptic bottle rinsing machine transfer arm being pivotably configured and disposed to aseptically guide bottles from said first at least one starwheel arrangement to said conveyor arrangement; and

said aseptic bottle rinsing machine transfer arm being pivotably configured and disposed to aseptically make contact with a portion of the necks of bottles above a bottom surface of a neck ring of the necks of bottles from said first at least one starwheel arrangement, and to aseptically guide the necks of bottles to aseptically slide the necks of the bottles along said transfer device and then aseptically guide the necks of bottles to said conveyor arrangement;

a second at least one aseptic starwheel arrangement being configured and disposed to convey bottles rinsed by said aseptic bottle rinsing machine to said aseptic bottle filling machine;

said aseptic bottle filling machine being configured and disposed to aseptically fill bottles with an aseptic liquid beverage material upon bottles being aseptically rinsed by said aseptic bottle rinsing machine;

said aseptic bottle filling machine comprising:

a rotor;

a rotatable vertical machine column;

said rotor being connected to said vertical machine column to permit rotation of said rotor about said vertical machine column;

a plurality of aseptic bottle filling elements for filling bottles with aseptic liquid beverage material being disposed on the periphery of said rotor;

each of said plurality of bottle filling elements comprising a receiving pocket being configured and disposed to receive and hold beverage bottles to be aseptically filled;

at least one liquid reservoir being configured to hold a supply of cold aseptic liquid beverage material;

at least one supply line being configured and disposed to connect said at least one liquid reservoir to said plurality of bottle filling elements to supply aseptic liquid beverage material to said plurality of bottle filling elements;

each of said plurality of bottle filling elements comprising an apparatus being configured to aseptically introduce a predetermined volume of cold aseptic liquid beverage filling material into interiors of bottles to a substantially predetermined level of cold aseptic liquid beverage filling material and to terminate the aseptic filling of beverage bottles upon cold aseptic liquid beverage filling material reaching said substantially predetermined level in bottles;

an aseptic bottle filling machine transfer device comprising:

an aseptic bottle filling machine transfer arm that is rigid, non-articulatable, and non-bendable and that is disposed substantially between said second at least one starwheel arrangement and said aseptic bottle filling machine rotor;

said aseptic bottle filling machine transfer arm being configured and disposed to aseptically guide bottles from said second at least one starwheel arrangement to said aseptic bottle filling machine rotor; and

said beverage aseptic bottle filling machine transfer arm being configured and disposed to aseptically make contact with a portion of the necks of bottles above a bottom surface of a neck ring of the necks of bottles from said second at least one starwheel arrangement upon the rotation of said second at least one starwheel arrangement, and to aseptically guide the necks of bottles to aseptically slide the necks of the bottles along said transfer device and then aseptically guide the necks of bottles into the receiving pockets of said aseptic bottle filling machine rotor;

a third at least one starwheel arrangement being configured and disposed to aseptically move bottles out of said aseptic bottle filling machine upon bottles being aseptically filled with a cold aseptic liquid beverage material;

said aseptic bottle closing machine being configured and disposed to aseptically close tops of filled bottles subsequent to bottles being aseptically filled with cold aseptic liquid beverage material;

said aseptic bottle closing machine comprising:

a rotor;

a rotatable vertical machine column;

said rotor being connected to said vertical machine column to permit rotation of said rotor about said vertical machine column;

a plurality of closing devices being disposed on the periphery of said rotor;

each of said plurality of closing devices being configured and disposed to aseptically place closures on filled bottles;

each of said plurality of closing devices comprising a receiving pocket being configured and disposed to aseptically receive and hold filled bottles;

an aseptic bottle closing machine transfer device comprising:

an aseptic bottle closing machine transfer arm that is rigid, non-articulatable, and non-bendable and that is disposed substantially between said third at least one starwheel arrangement and said aseptic bottle closing machine rotor;

said aseptic bottle closing machine transfer arm being configured and disposed to aseptically guide bottles from said third at least one starwheel arrangement to said aseptic bottle closing machine rotor; and

said beverage aseptic bottle closing machine transfer arm being configured and disposed to aseptically make contact with a portion of the necks of bottles above a bottom surface of a neck ring of the necks of bottles from said first closing machine conveyor device upon the rotation of said first closing machine conveyor device, and to aseptically guide the necks of bottles to aseptically slide the necks of the bottles along said transfer device and then aseptically guide the necks of bottles into the receiving pockets of said aseptic bottle closing machine rotor; and

a fourth at least one starwheel arrangement being configured and disposed to move rinsed, filled, closed bottles out of said aseptic bottle closing machine upon bottles being closed.

2. The aseptic bottle filling plant according to claim **1**, wherein each of said transfer arms comprises a contour, which contour is shaped to complimentarily engage a portion of the necks of bottles above a bottom surface of a neck ring of the necks of bottles to guide the necks of bottles.

3. The aseptic bottle filling plant according to claim **2**, wherein said contour is shaped to complimentarily engage only a portion of the necks of bottles above a neck ring of the necks of bottles to guide the necks of bottles.

4. The aseptic bottle filling plant according to claim **3**, wherein:

each of said transfer devices comprises a drive system; and

said drive system is connected to its corresponding transfer arm and configured to pivot its corresponding transfer arm.

5. The aseptic bottle filling plant according to claim **4**, wherein:

each of said transfer arms is detachably connected to its corresponding drive system; and

each of said drive systems is configured and disposed to receive and detachably connect with another transfer arm having a different contour which is different than said contour of said transfer arm to permit handling of bottles having a complimentary, different contour.

6. The aseptic bottle filling plant according to claim **5**, wherein each of said drive systems is configured and disposed to adjust the magnitude and/or position of the pivoting movement of said transfer arm.

7. The aseptic bottle filling plant according to claim **6**, wherein each of said transfer arms is at least partly coated with a friction-reducing coating for reducing friction between each of said transfer arms and bottles being contacted thereby.

8. The aseptic bottle filling plant according to claim **7**, wherein:

each of said transfer arms is at least partly coated with a wear-reducing coating for reducing wear of each of said transfer arms; and

said plurality of aseptic bottle handling machines further comprises a bottle labeling machine being configured and disposed to label bottles.

9. The aseptic bottle filling plant according to claim **2**, wherein said contour is shaped to complimentarily engage only a neck ring of the necks of bottles to guide the necks of bottles.

10. The aseptic bottle filling plant according to claim **9**, wherein:

each of said transfer devices comprises a drive system; and

said drive system is connected to its corresponding transfer arm and configured to move or controllably pivot its corresponding transfer arm.

11. The aseptic bottle filling plant according to claim **10**, wherein:

each of said transfer arms is detachably connected to its corresponding drive system; and

each of said drive systems is configured and disposed to receive and detachably connect with another transfer arm having a different contour which is different than

said contour of said transfer arm to permit handling of bottles having a complimentary, different contour.

12. The aseptic bottle filling plant according to claim 11, wherein each of said drive systems is configured and disposed to adjust the magnitude and/or position of the pivoting movement of said transfer arm.

13. The aseptic bottle filling plant according to claim 12, wherein each of said transfer arms is at least partly coated with a friction-reducing coating for reducing friction between each of said transfer arms and bottles being contacted thereby.

14. The aseptic bottle filling plant according to claim 13, wherein:

each of said transfer arms is at least partly coated with a wear-reducing coating for reducing wear of each of said transfer arms; and

said plurality of aseptic bottle handling machines further comprises a bottle labeling machine being configured and disposed to label bottles.

15. The aseptic bottle filling plant according to claim 2, wherein said contour is shaped to complimentarily engage both a neck ring and a portion above a neck ring of the necks of bottles to guide the necks of bottles.

16. The aseptic bottle filling plant according to claim 15, wherein:

each of said transfer devices comprises a drive system; and

said drive system is connected to its corresponding transfer arm and configured to move or controllably pivot its corresponding transfer arm.

17. The aseptic bottle filling plant according to claim 16, wherein:

each of said transfer arms is detachably connected to its corresponding drive system; and

each of said drive systems is configured and disposed to receive and detachably connect with another transfer arm having a different contour which is different than said contour of said transfer arm to permit handling of bottles having a complimentary, different contour.

18. The aseptic bottle filling plant according to claim 17, wherein each of said drive systems is configured and disposed to adjust the magnitude and/or position of the pivoting movement of said transfer arm.

19. The aseptic bottle filling plant according to claim 18, wherein each of said transfer arms is at least partly coated with a friction-reducing coating for reducing friction between each of said transfer arms and bottles being contacted thereby.

20. The aseptic bottle filling plant according to claim 19, wherein:

each of said transfer arms is at least partly coated with a wear-reducing coating for reducing wear of each of said transfer arms; and

said plurality of aseptic bottle handling machines further comprises a bottle labeling machine being configured and disposed to label bottles.

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APPENDIX C – RELATED PROCEEDINGS

None.